January 1938

TECHNOLOGY REVIEW



technology review

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THE TABULAR VIEW

LIFE begins at 40. We will be excused, we hope, for this bromide by the fact that this issue marks the 40th anniversary of The Review, its first number having been published under the date of January, 1899, 260 issues ago. While 40 years is a venerable age as magazines go, we nevertheless feel that it is not a birthday that deserves fanfare — such fanfare as we shall certainly expect to drum up when The Review reaches the half-century mark. We wouldn't bring the matter up at all were it not an opportunity to thank all of our friends for their steadfast support as demonstrated by their many letters, their responses to inquiries, and their suggestions for improvements. This friendliness and interest emboldens us, in return, to say and to believe that for The Review life is just beginning.

WITH the possible exception of brain teasers, no subject published in The Parish and Par subject published in The Review in recent years has provoked such widespread response as that of stereoscopy. It all began with an article, more journalistic than scholarly, by members of The Review staff last March (page 191), but it perhaps reaches its apogee with the article on page 121 by Dr. Ralph P. Johnson, '36. A physicist, Dr. Johnson is now plying his trade in the research laboratories of General Electric Company. He speaks and writes with a soft southern accent. ALBERT G. DIETZ, '32, tells us that he has been interested in woods as long as he can remember, although he admits having deserted his favorite material for a brief session in a steel mill. In his present capacity as an instructor in building construction, he has an admirable opportunity to study wood as an engineer. His article on page 124 is the direct result of the months he spent last summer at the Forest Products Laboratory at Madison, Wis. I The Editor of The Review has lived beside the Chattahoochee, and he knows the Marshes of Glynn and, better still, the poetry of Sidney Lanier, who wrote with beauty and understanding of the deep South and who also preached the relationship of poetry and music. It is a pleasure, therefore, to present his grandson in the pages of The Review, writing on another relationship with music — that of science (page 128). Sterling Lanier is an instructor in English at Technology and an able musician. He writes not as a scientist but rather as an artist who is interested in what science can do for his art.

THE REVIEW received a melancholy sort of pleasure from the fact that it published in its December issue an article that largely was a tribute to the genius of William E. Taylor, Vice-President of the American Can Company, who died shortly after that issue appeared. It was a slight tribute to a great engineer, and we are glad that it was published before Mr. Taylor's untimely death. ¶ Another death coming with all the force of a coincidence is that of Dr. Nils Gustaf Dalén, with whom the first story of the Trend of Affairs section of this issue largely deals.

No. 3

Just for Fun!

A CHALLENGE

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A RECTANGULAR leaded glass window was made up of twelve rectangular pieces of glass having the following dimensions in inches:

3×10	5 x 20	10×12	10×20
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5 x 7	8×23	10×15	13×15

What were the proportions of the window, and how were the pieces of glass arranged? (There were no gaps or overlappings.)

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MAIL RETURNS

LETTERS FROM REVIEW READERS

Brain Teasers — Awards and Answers

MAY the best men win!" we wrote in announcing in November that the first five readers returning the best answers to the Fourth Series of Brain Twisters would each receive a year's free subscription to The Review. We had forgotten, in our masculine complacency, that a woman returned one of the best sets of answers in a similar contest last year and we had not anticipated that two women would submit winning solutions to this latest series.

The Review called in Dr. R. D. Douglass, '31, of the Institute's Department of Mathematics, to check the returns and select the winners in consultation with the Editors. This he did with his usual enthusiasm and thoroughness, and his slate was accepted without change.

The five winners, in the order in which they were graded, taking into consideration the time of receipt, completeness, and accuracy, were: (1) ALICE HUNTER KIMBALL, '36 (with GEORGE E. KIMBALL); (2) WALTER O. PENNELL, '96; (3) WILLIAM L. SULLIVAN, '27; (4) DONALD S. MILLER, '27; (5) LOUISE B. WHIPPLE.

Others, whose returns lacked the completeness of the foregoing five or whose answers arrived later, but who nevertheless sent in admirable sets of solutions, were: Edward H. Barry, '16, Charles H. Bartlett, Hobart O. Davidson, '20, Lang S. Dzung, '37, Howard M. Edmunds, '05, James C. Funnell, Martin A. Gilman, '36, R. M. Packard, and Francis E. Wilmot, '25. To all of these, The Review makes an editorial genuflection, admits them to its inner circle of Brain-Teaser Solvers.

We present below, for those who pant for the answers, the solutions which rated No. 1:

From Alice H. Kimball, '36, George E. Kimball:

 $No.\ 1.$ Suppose that the number of coconuts in the pile is divided into parts, one of A_1 , the other of A_2 coconuts. In each operation, one coconut is discarded from the A_1 pile, each pile is divided into four equal parts $(B_1$ and $B_2)$, and one part discarded. The remaining parts are now combined so that at this point there are $3B_1$ coconuts in the first pile and $3B_2$ in the second pile. The process is repeated three times more.

It is evident that the number A_2 must be divisible by 4, four times. Hence, $A_2 = 4^4n$, where n is an integer. By taking any particular solution for A_1 , the general solution is then obtained by adding 4^4n to this.

It is also evident that a possible value for A_1 is -3, for after discarding one coconut, the remaining number will be -4. One-quarter of this is -1, and three-quarters is again -3. This process may be repeated as many times as we wish.

The general solution of the problem is, therefore,

$$A=4^4n-3.$$

The lowest positive value is obtained with n = 1, and gives A = 253.

No. 2. By an argument similar to that used in the first problem, we find that the original number of coconuts A must

be of the form $A = 5^5n - 4$, if the divisions during the night are to be successful. The number B left in the morning will then be $B = 4^5n - 4$.

For the morning division to come out even, we must also have B = 5m, where m is also an integer. We must therefore have 1024n - 4 = 5m.

The integral solutions of this equation are

$$m = 1024r + 204$$
$$n = 5r + 1$$

where r is an integer. Taking r = 0 gives n = 1 and A = 3121.

No. 3. Let a be the radius of the pond, S the area over which the cow can graze, and w the angle formed by the tether in the two extreme positions of the cow on the shore of the pond. A little geometry then gives for S,

of the pond. A little geometry then gives for S, $S = \pi a^2 + a^2(2\pi - w)\cos w + a^2\sin w$. Since the area of the pond is one acre, and the area S must also be one acre, we must have

$$S = \pi a^2$$
, or $a^2 (2\pi - w) \cos w + a^2 \sin w = 0$,

which reduces to $\tan w - w + 2\pi = 0$.

This transcendental equation can be solved only approximately. The approximate solution is $w=1.790=102.56^{\circ}$.

The length of the rope is given by

$$x = 2a \cos(w/2)$$

= 1.251a.

Since a = 117.75 feet, the length of the rope is 147.31 feet.

No. 4. Let a be the radius of the pasture, and w be the angle formed by the tether in the two positions when the cow is as far along the fence as she can get. The area S over which the cow can graze is, then,

$$S = \pi a^2 + a^2 w \cos w - a^2 \sin w$$
.

We are given that $S = \pi a^2/2$. Hence,

$$a^2 w \cos w - a^2 \sin w + \pi a^2/2 = 0$$
, or,
 $w \cos w - \sin w + \pi/2 = 0$,

the root of which is w = 1.906.

The length of the rope is given by

$$x = 2a \cos (w/2)$$

= 100 cos .953
= 57.92 feet.

No. 5. Let A be the original position of the boat, B the landing place, C the place where the man strikes the road, and D the tavern. Also let E be the point at which the road meets the shore, and F the point at the foot of the perpendicular from the original position of the boat to the shore. Let the angle ECB be x and the angle BAF be y.

Let us first assume that the point B is known. The point C is then determined by the fact that the time over the route BCD must be a minimum. If the time for this part of the trip is t_1 ,

$$t_1 = BC/6 + CD/10.$$

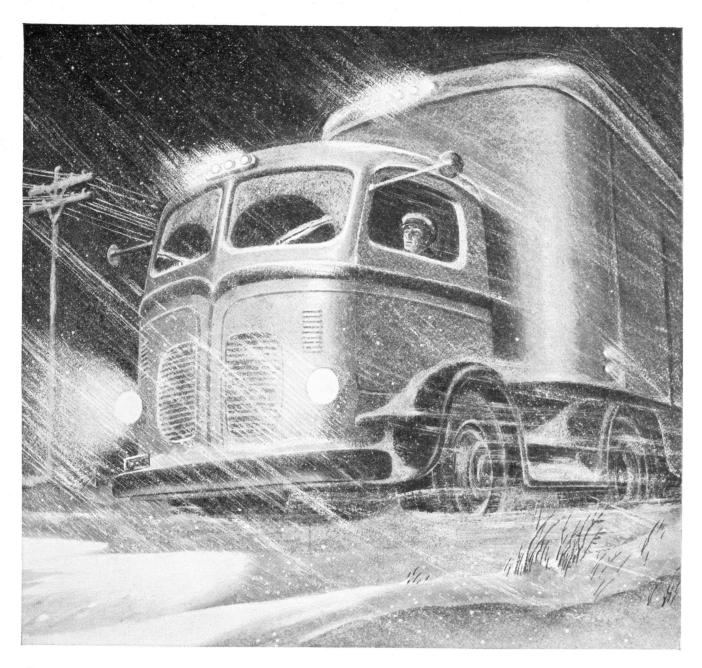
But $BC = EB/\sin x$, and $CD = 5 - EB/\tan x$. Hence,

$$t_1 = EB/6 \sin x + 5/10 - EB/10 \tan x$$

 $dt_1/dx = -EB \cos x/6 \sin^2 x + EB/10 \sin^2 x$.

For the minimum,
$$dt_1/dx = 0$$
, which requires $\cos x = .6000$. Note that this result is independent of EB .

Now let us consider the point C as known. Then the point B is determined by the necessity of (Continued on page 108)



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MAIL RETURNS

(Continued from page 106)

making the time over the path ABC a minimum. If this time is t_2 ,

$$t_2 = AB/2 + BC/6.$$

But $AB = 1/\cos y$, and $BC = EC/\cos x$. Hence,

$$t_2 = 1/2\cos y + EC/6\cos x$$

 $dt_2 = (\sin y/2 \cos^2 y) dy + (EC \sin x/6 \cos^2 x) dx.$

We also have $EF = \tan y + EC \tan x = \text{constant}$. Hence, $\sec^2 y \, dy + EC \sec^2 x \, dx = 0$.

Putting $dt_2 = 0$, we now find

$$\sin y = (1/3) \sin x.$$

These two results give $x=53^{\circ}$ 8' and $y=15^{\circ}$ 28'. This, in turn, gives AB=1.038 miles, BC=3.403 miles, CD=2.958 miles. The times for the three stages are: AB, .519 hours; BC, .567 hours; CD, .296 hours. The total time is 1.382 hours, saving all of seven minutes over the obvious way.

No. 6. Let s_1 be the distance the car goes before the actual breakdown, s_2 the distance between this point and the place of the hypothetical breakdown, and s_3 the distance from this last point to the destination. Let 5v be the speed of the car before the breakdown, and 3v the speed of the car after the breakdown. If t is the time in which the journey would have been made without a breakdown, we have the following equations:

$$\begin{array}{lll} s_1/5v + s_2/5v + s_3/5v = t \\ s_1/5v + s_2/3v + s_3/3v = t + 120 \\ s_1/5v + s_2/5v + s_3/3v = t + 80 \\ s_1/5v & = 60 \end{array}$$

Solving for the five unknowns:

 $s_1 = 50$ miles $s_2 = 50$ miles $s_3 = 50$ miles $s_4 = 50$ miles per hour

 $s_3 = 100 \text{ miles}$ t = 240 minutes = 4 hours

The total distance is, therefore, 200 miles.

No. 7. Let x be the age of the girl now. Four years before the girl was born, the man was 24 - x. When the man was five years younger than the girl is now, the girl was 2x - 33. Hence, 24 - x = 2(2x - 33).

Solving, x = 18 years.

No. 8. Let x be the age of the ship. The age of the boiler is then 49 - x. When the ship was 49 - x, the boiler was 98 - 3x. Hence, x = 2(98 - 3x).

Solving, x = 28.

No. 9. Let m be the number of men, w the number of women, and c the number of children. Then,

$$\begin{array}{cccc} m+w+c &= 100 \\ 5m+w+c/10 &= 100 \\ \hline -4m & -9c/10 &= 0 \\ 40m &= 9c \end{array}$$

For integral solutions, m = 9n; c = 40n; w = 100 - 49n. The values of n (which must be integral) which give positive solutions are n = 0, 1, 2. These give the results shown in the table below:

n	m	w	c
0	0	100	0
1	9	51	40
2	18	2	80

No. 10. Let r be the lower of the two rates, and R the higher rate. Suppose the woman with 10 eggs sells a at the low rate and A at the high rate. Suppose that the woman with 30 eggs sells b at the low rate and B at the high rate. Suppose that the woman with 50 eggs sells c at the low rate and C at the high rate.

(Concluded on page 148)

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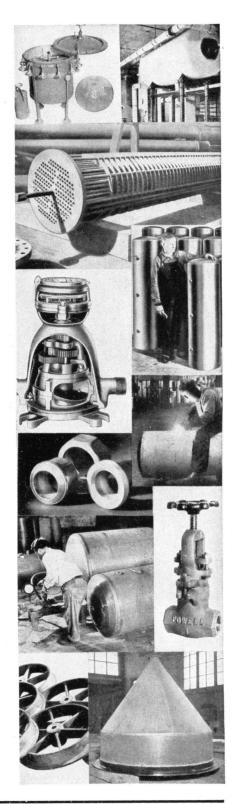
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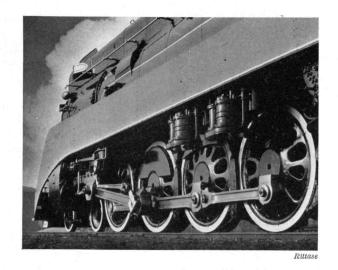
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THE TECHNO OGY REVIEW

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 40, NO. 3

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StaffEditorial: Marjorie Fuller, Jane McMasters. Business: Madeline McCormick, Ruth King

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Charles S. Foster

LIKE SOME ANCIENT DINOSAUR

. . . appears this germinating kernel of corn. In describing this beautifully composed and lighted "still life," Mr. Foster has set down these details: "Evergreen corn, three days germinating at 80 degrees F., after having soaked 15 hours in water at 75 degrees F. The root hairs are plainly visible. Made on Process Pan film, no filter, 15-minute exposure f.22. One miniature spotlight (six-volt auto headlight — 32 candle-power bulb) with small pieces of paper for reflectors. Schneider f.4.5 lens, 50-millimeter focal length. Camera extension: 23 inches. Magnification: 60 times [slightly less in above reproduction]"

THE

TECHNOLOGY REVIEW

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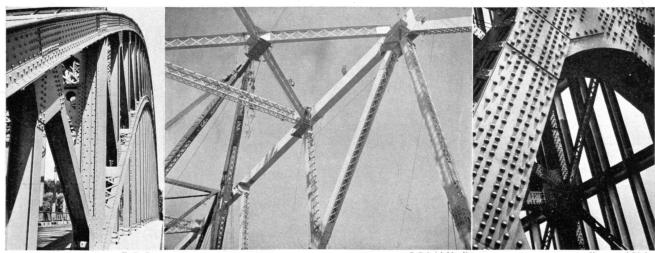
January, 1938

The Trend of Affairs

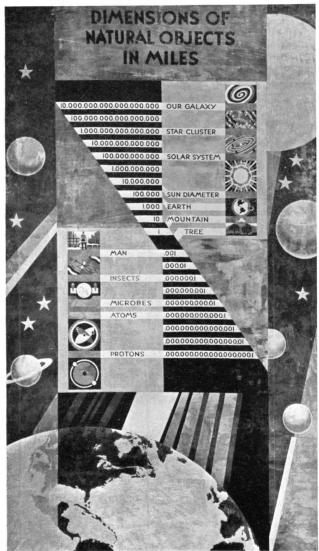
Science in the Kitchen

T is generally agreed by matrimonial experts," declares a wisely anonymous scholar, "that the honeymoon is over when the husband begins to take more interest in the kitchen than any room in the house.' While the Victorian bride might have had reason to gaze suspiciously upon any male nose among her pots and pans, today's young wife must realize that, with built-in equipment, the kitchen represents a husky fraction of the total investment in the little love nest, and with auxiliary apparatus which may include anything from three-fluid systems to synchronous motors, it is either financial anguish or scientific curiosity that draws friend husband to her traditional domain. If the well-meant efforts of Nobel Prize winners, efficiency experts, and hordes of gadget makers have served only to confuse and annoy those women who would welcome a little comfortable tradition in their domains (see "Technics and the Woman" in last January's Review), let them reflect that observers (male) continue to chide engineers (male) for neglecting the kitchen.

Edward R. Weidlein, director of the Mellon Institute, recently spoke disparagingly of the waste heat which stove designers are still allowing to escape into the air, making, as women are fond of complaining, cooking a hardship. The usual range transfers to the food an average of about 20 per cent of the heat in the fuel; Dr. Weidlein referred to a stove which is over 80 per cent efficient. This interesting stove, it seems, was developed because of an unfortunate accident. Some 15 years ago, Nils Gustaf Dalén (who died on December 9), famous for his utilization of acetylene dissolved in acetone for automatic marine and railway lighting,



STUDIES IN STEEL



From a mural painted for the Museum of Science and Industry, Chicago

FROM BIG TO LITTLE

Note how near man is to the center of this scale — a point of vantage enabling him better to observe both macrocosm and microcosm. The above scale is in miles, but if we express the scale in terms of particles, man's position becomes even more strategic. Between the hydrogen ion (one particle) and the star (about 10⁵⁸ particles) stands man — 10²⁹ particles

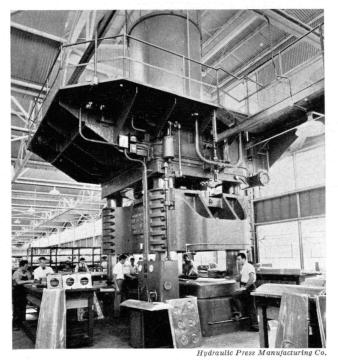
inventor of the so-called sun valve for actuating the lights in unmanned lighthouses, and recipient of the Nobel Prize in physics in 1912, was blinded by an explosion. Being largely confined to his house thereafter, he turned his attention to the kitchen and decided to do something about the disgustingly low efficiency of stoves then (and now) in use. What he did, finally, was to design a stove which can cook a day's meals for a family of 12 on eight to ten pounds of chestnut-sized anthracite costing about seven cents.

The chief feature of the design, perhaps, is its utilization of the principle of thermal storage. When no cooking is being done, the heat of the continuously burning fire raises the temperature of a massive alloy-iron casting, the top of which is the cooking surface. The temperature of this surface (about 800 degrees F.) is controlled by a thermostat acting on the flue. Areas of lower

temperature are provided in other parts of the stove. Very thorough insulation prevents much radiation into the kitchen, even the cooking surfaces being covered by insulated lids when not in use. In spite of its efficiency, however, the unit is not likely to become popular with newlyweds or others engaged in light housekeeping, for it weighs well over half a ton and costs somewhat more than a good used car. Most of the stoves thus far sold (since 1927 in Europe and since 1934 in this country) have gone to large homes or to restaurants, and hospitals.

Discussion of this range cannot be dismissed without our noting that while the feature of thermal storage may appear novel to a sophisticated American public, it would fail to impress a peasant in North Central Europe, where housewives have been cooking with stored heat for generations. Even the poorest kitchens in the villages dotting those plains have a large (ten feet square, or so) brick oven in which cooking is done by filling the firebox with wood, burning the wood to ashes, sweeping out the ashes, and then placing the pots and kettles upon the red-hot bricks. Thermostat control is accomplished by a judicious sprinkling with water. These stoves have, in addition, some features overlooked by Nobel Prize Winner Dalén: The proud owners can — and do — keep the chickens underneath the oven, while they themselves (four or five abreast) sleep on top of it, the heavy brick walls, of course, providing the necessary insulation.

Jumping from hot to cold, Dr. Weidlein tantalized budget balancers by hinting at the quick development of a combination cookstove and refrigerator in which waste heat from the stove would keep the beer cold. While such a unit is only a scientific possibility, there



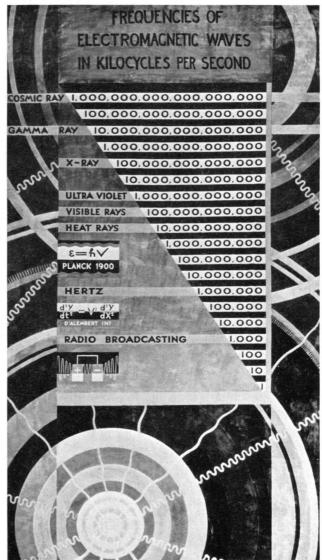
CAPACITY: 10,000,000 POUNDS

World's largest high-speed hydraulic press recently installed by Douglas Aircraft Company for fabricating airplane parts. Oil under a pressure of 2,500 pounds per square inch actuates the six-foot hydraulic ram have been advances in the domestic refrigeration field (even neglecting to mention such sensational improvements as pastel shades and streamline corners) which merit attention. The interest of engineers in so-called convenience gadgets indicates considerable stability in basic design, yet the steady stream of patents in the refrigeration field (about 1,000 a year) has had the effect, even in the past five years, of (1) improving dependability greatly, (2) increasing efficiency by 50 per cent to 100 per cent, (3) reducing noise until the noisiest domestic refrigerators of today are quieter than the quietest of five years ago, and (4) lowering prices by about 50 per cent. Important because of its effect in making the potential market of the refrigerator almost unlimited is the introduction of absorption designs which can operate on kerosene, and are thus available not only to rural areas in the United States but also to vast sections of Latin America, where a government yardstick for power rates would as yet be a novelty.

Nevertheless, in this, the one country where such an appliance as a mechanical refrigerator could seriously be regarded as out of the luxury class, only one-sixth of the nation's homes have such conveniences, and half of them have no means whatever for artificial refrigeration. It would be a feather in the cap of any sophist to prove this situation the result of a neglectful science. Where money flows freely, the gap between technical advance and its kitchen applications narrows to the vanishing point. A house recently built in Des Moines, Iowa, contains an automatic water-softening and heating plant, electric garbage disposal, an electric dishwasher, a portable broiler for steak parties in the recreation rooms or on the terraces (just the thing for that pent house on Tenth Avenue), a small cold-storage room for freezing game, a cooling room for storing meats in quantity, and an intercommunicating telephone system with an extension in the kitchen. It's no great task to design such apparatus; the trick is to fit them into an eight-bytwelve foot kitchenette on a lathe operator's wages.

Yet there are manufacturers who are bold enough to tackle this delightfully rugged problem. Some efforts take the form of coöperation with other builders so that stock units will dovetail and harmonize, thus enabling kitchens to be built up piece by piece into a correlated whole. Partly as the result of such work, the so-called continuous counter-shelf, in which the top, or working areas, of sink, range, cabinet, and so on join to form a continuous, level surface, has become a common feature. Described by some as the most notable of recent improvements in the kitchen, it illustrates the increasing attention that is being given to the work sequences and motion studies of the housewife. The Philistines (and there are probably more among women than among men) will sniff, but the number of steps which have already been saved by such studies, if placed end to end, would cause a panic in the sole-leather market.

Also of great potential promise are the efforts of some manufacturers to design low-cost, unit kitchens which will crowd into galleylike compactness all the essential elements of an up-to-date kitchen. One such model contains stove, sink, cabinet, and refrigerator in a volume that measures 80 by 45.75 by 22.25 inches. Perhaps one of these manufacturers is the yet unrecognized Ford



From a mural painted for the Museum of Science and Industry, Chicago

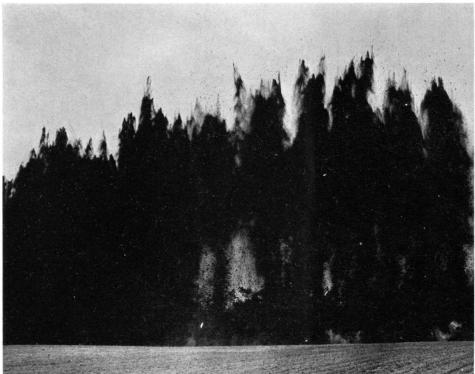
THE RANGE OF RADIATIONS

From long radio waves with a length of miles to cosmic waves with a wavelength of two hundred million millionths of an inch runs the span of radiating energy as graphically shown above

who will lead his millions of followers from one model to another into a land of uniformly spotless, inexpensive kitchenettes which do everything for Mrs. Jones while she plays bridge or tends the kiddies.

Protean Proteins

THE versatility of the virus was brought to the attention of readers of The Review some two years ago (February, 1936, page 172), when Wendell M. Stanley of the Rockefeller Institute for Medical Research succeeded in showing that the virus causing tobacco mosaic is a huge protein molecule which, in the presence of the living tissue of the plant, reproduces with great rapidity, and infects the plant exactly as virulent bacteria would do. Associates of Dr. Stanley have now isolated for the first time two viruses which cause serious diseases in animals, and have determined that they are enormous protein molecules, that which





The Explosives Engineer and W.P.A

DIGGING A DITCH WITH DYNAMITE

Above is shown a ton of dynamite in action, cutting a 1,700-foot ditch through a swamp in Delaware. Note how far above the trees the debris was thrown. At the right is the ditch created by the blast

causes equine encephalitis having a probable molecular weight twenty-five million times that of the hydrogen molecule

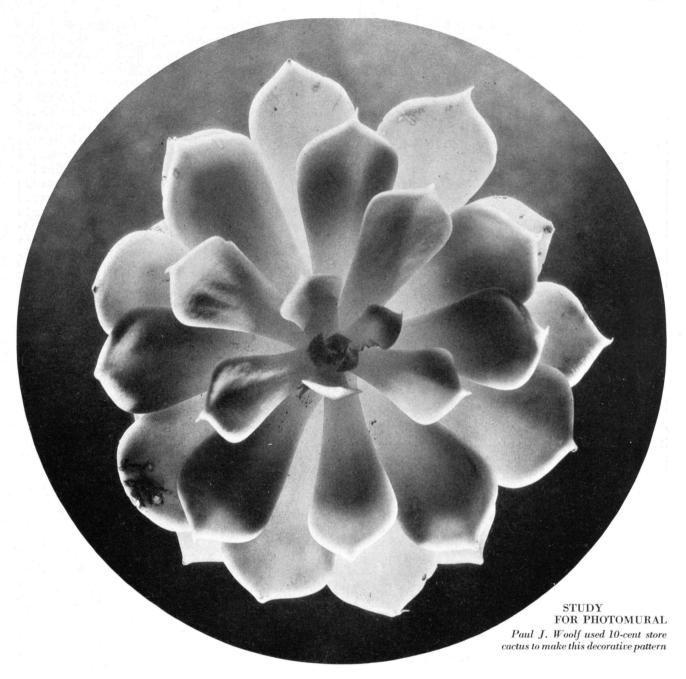
Equine encephalitis attacks horses as sleeping sickness does men, invading the central nervous system. Carl Ten Broeck isolated this virus through the centrifugation technique which has been practiced in this field since 1935. The amazing molecular weight, as found by Thomas J. G. Wyckoff, is not stable, the heavy material disintegrating swiftly into material of low molecular weight if it stands at room temperature. The second virus reported by Dr. Stanley was isolated from the tissue of rabbit warts, has a molecular weight twenty million times that of the hydrogen molecule, produces warts when injected into rabbits, and is several thousand times more active than the tissues from which it was extracted. One ten-millionth of a gram is enough to start infection.

This advance of knowledge of the virus proteins, from the fact that they infect plants to the fact that they infect animals, has especial significance to man because many of the most deadly and baffling diseases which shorten his span are virus diseases — yellow fever, rabies, encephalitis (or sleeping sickness), infantile paralysis, and measles, for instances. Add to these the fact that cancerous tumors contain a virus which will pass through the finest filters and still produce cancers in a human body. The study of these plagues may well be expedited amazingly as knowledge of the mysterious and monstrous protein crystals grows.

A second significance lies in the further demonstration, through the present achievement, of a strange fact about the protein virus molecules which had been shown by the earlier research. Removed from the presence of living tissue, the crystal is static; it does not grow. Place it in living tissue, and it reproduces itself. Thus in one state it exhibits none of the properties of life; yet in the other it possesses, in the capacity of reproduction, one of the chief attributes of living things. The later developments have shown, moreover, that in both states it exhibits another important property of living things: It mutates, or changes to other forms. Mutants, or molecules whose form has changed either in the living cell or, through the action of chemical means, in the test tube - produce a disease different from that produced by the original molecule. In addition, they are able to reproduce. Dr. Stanley told a symposium on biophysics at Philadelphia that "the virus proteins appear to be the elementary biological system," and that knowledge of the mechanism by which they reproduce is of tremendous importance because it is the basis of biological activity. Yet this elementary biological system appears to be a molecule.

Another extension of knowledge about the protean proteins has been announced by John H. Northrop, also of the Rockefeller Institute for Medical Research, recipient of the Chandler Medal of Columbia University for 1937. Dr. Northrop, surveying the study of enzymes — catalyzing substances which living cells employ in carrying out the chemical processes necessary to life — described their isolation in the form of crystalline proteins and told of the preparation of several proteins closely related to them. Study of these points to the conclusion that relatively slight changes in an inactive protein may cause the formation of an active

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enzyme. Moreover, under certain conditions, it appears that the reaction is autocatalytic, that is, that some enzymes have the power of forming themselves from inert proteins.

Pepsin, trypsin, chymo-trypsin, and their inactive precursors have been isolated and crystallized, Dr. Northrop stated. In addition, a nucleoprotein possessing the properties of bacteriophage, "the beneficent virus" that destroys bacteria, has been isolated and appears to have a molecular weight of about two hundred million, which compares interestingly with the weight reported by Dr. Stanley for the rabbit wart virus, i.e., ten times as great.

Both the virus and the enzyme, it thus appears, are chemical compounds, presumably susceptible to study by chemical methods. Both appear to be protein molecules and to possess the peculiar quality of reproducing themselves in the presence of living cells. The shadowy region between that which is alive and that which is not alive seems more populous as a result of these researches.

Tunnels, Their Story

GREATER NEW YORK'S Christmas stocking last on month contained the official privilege to begin using the south tube of the Lincoln Tunnel, mid-town twin of the now familiar and prosperous Holland Tunnel. For the present the Lincoln's single tube will handle traffic in both directions, until the north passage, which is scheduled to be ready three years hence, assumes its destiny of caring for vehicles headed toward New

Mr. Black's researches bring into a connected account

a record which began some four thousand years ago with

a tunnel some three thousand feet long, built under the

Euphrates River to connect two portions of Babylon.

It had a cross section sufficient to accommodate a sub-

way train! Mr. Black also notes that the first use of

gunpowder in tunneling was in the building of the

Languedoc Canal in France during 1679 to 1681, and

that the Terrenoir, begun in 1826 near Saint-Étienne in

the same country, was the first tunnel for a railroad, the

motive power being steam rather than horses; that the

first tunnel in the United States for any purpose was the

Auburn on the Schuylkill Canal in Pennsylvania, opened

BRIDGE

Of the six spans shown, those with asterisks by their names have won beauty prizes bestowed by the American Institute of Steel Construction. Left. A different view of the East Bay Crossing, San Francisco-OaklandBay Bridge. Below. Yaquina Bay Bridge, Oregon Coast Highway

in 1821. Very properly he devotes most of one chapter to the early Thames tunnels, beginning with the first attempt of Trevethick in 1807, a miner who was soon obliged to desist when the pressure of the river broke through. In 1825 Sir Marc I. Brunel

through. In 1825 Sir Marc 1. Brunel took over and, though interrupted thrice by flooding, he completed the tunnel in 1842 with the aid of protective devices which became the forerunner of the modern tunneling shield. Then, because of a lack of

t so of fee s s s s r

© Gabriel Moulin

Jersey. It is also planned that in 1940 or 1941 the Queens-Midtown Tunnel will go into service. This project, a pair of vehicular arteries under the East River, is to have a subsurface connection with the Lincoln beneath the cross streets of Manhattan. Thus it will become possible for autoists to drive underground

between Long Island and Jersey — something which railroaders have been doing since 1910.

The Holland was not the original tunnel to be pushed through the silt of the Hudson River's bed, nor was it the first to be mechanically ventilated, though it did have a ventilating system markedly superior to any of its predecessors. Instead, its fame rests securely upon the fact that it was the first long tunnel planned for heavy traffic, and it became the forerunner of a series of subaqueous vehicular tunnels brought into being by the demands of a motor age. This roster includes one in California between Oakland and Alameda, the international Detroit-Windsor connection, the Sumner Tunnel under Boston Harbor, the Queensway under the Mersey at Liverpool, and that at Antwerp, Belgium.

Already most of these, and of the special difficulties met and overcome during their building, have been commented upon in The Review. Nor have these pages neglected to accord tribute to the accomplishments represented by the construction of railroad tunnels such as the Moffat, those through the Alps, and the Great Northern's 7.79-mile bore through the Cascades in the state of Washington (still the American record holder for length); of aqueducts such as the vast systems for New York (in which the genius of the late J. Waldo Smith, '86, played a major part), Los Angeles, and San Francisco; of subway systems such as the most recent, that of Moscow. Consequently, it is with a sympathetic understanding and appreciation that The Review commends the recent volume of Archibald Black of the Port of New York Authority, "The Story of Tunnels," published by Whittlesey House.



Right. Hurricane Deck Bridge* over Lake of the Ozarks, Missouri

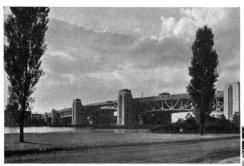
approaches, Brunel's work remained useless for 23 years! It was in constructing the second Thames Tunnel, in 1869, that P. W. Barlow and James Henry Greathead introduced a cylindrical tunnelling shield, substituted cast-iron rings for the brickwork formerly used in constructing the tunnel shell, and employed compressed air in connection with the shield.

Laymen can readily appreciate the major hazards present when tunneling under rivers or harbors, but Mr. Black's account of the difficulties still met with in boring through mountains will be illuminating even to many engineers. From 1872 to 1881 inrushing water, disease resulting from rock dust, high temperatures, and air vitiated by oil lamps, the breathing of men and animals, and the fumes of explosives seriously threatened to cause abandonment of the St. Gotthard, second of the Alpine tunnels. Electrification, ventilating precautions, and other agencies successfully relieved some of these problems in subsequent projects, but in building the original Simplon Tunnel (1898 to 1906) terrific inflows of hot water under high pressures were encountered, so that in the fall of 1902 a peak temperature of 131 degrees F. made it imperative to stop work on the north heading in order to arrange a drainage system by means of a supplementary small-bore tunnel. In the Loetschberg (1906 to 1913) the original course had to be amended

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and a detour provided to carry the tunnel around a river which broke through a deep crevice, flooding an entire working for about three-quarters of a mile back from the heading. Still more recently, in the Tanna Tunnel of the Japanese government railways (1918) to 1934), water under high pressures and temperatures, in conjunction with earth slides and rock collapse under enormous ground pressures, made necessary concrete lining up to thicknesses of six and a quarter

Should still further examples of what tunnel builders must be prepared to overcome be desired, reference is made to Mr. Black's chapter on the several Pacific Coast aqueducts, wherein he mentions obstacles such as the unexpected appearance of methane and other gases poisonous or explosive in their nature, of quicksand, and of "swelling ground." Or, possibly, some as yet uncatalogued items will be added as progress continues on the Mono Craters Tunnel, which will increase by about 45 per cent the supply of water which Los Angeles now gets from the Owens River Aqueduct. Though the index of Mr. Black's book omits its name, the Mono Craters Tunnel is distinguished for two reasons — it is one of the longest



Left. Fore River Bridge,* Massachusetts

ever driven (11.3 miles) and it is the only tunnel in the United States to pass underneath an extinct volcano.

Odors and Coconuts

T'S a rare restaurant owner who I shows any visible interest in the science of forgotten dimensions. His

customers' noses, however, are another matter, and the host, particularly if his enterprise has extended to air conditioning, is often acutely aware of a problem which has bothered many a noble beak long after the per capita consumption of soap became an index of civilization.

Civilized human beings frequently insist on drinking variously flavored mixtures of alcohol and water, burning dried tobacco leaves, anointing their bodies with perfumes, eating foods cooked in fats and oils, enjoying these things most when assembled in herds, and perversely objecting when the concentration of vapors from these substances reaches the point of disturbing noses not accustomed to robust smells. Importation of fresh, outside air is one solution, but where this outside air differs markedly in temperature and humidity from that inside, a substantial saving in energy can be made

by recirculating the conditioned air. Here enters the problem of removing enough of the odors to keep the air comfortable, and, with it enter coconuts and the science of forgotten dimensions (more soberly known as colloid chemistry).

Certain materials, among them suitably prepared carbon, have the property of selectively adsorbing gases on their surfaces. Lately, carbon from coconut shells has been found particularly effective as an adsorbent in air-conditioning work because it is very active toward hydrocarbons and organic gases. In the latter class fall most of the objectionable odors mentioned. Properties adding to the usefulness of coconut carbon are its hard, dense structure, its slight attraction for water vapor, and its ability to take up a relatively large proportion of its weight in gases before requiring revivification.

Since there is a threshold concentration for all odors, below which they cannot be detected (for butyric acid, one of the common body odors, the threshold lies at about 0.0000624 parts per million), only part of the recirculated air need be passed through the coconutcarbon filters.

First Lady

THERE is nothing new under the sun" is one adage L that is forever cropping up to prove itself. Recent stories tending to show that women inventors are rarities have brought out the fact that women have always been inventors but they were not properly publicized. Today their press agents are many and

> zealous. The propaganda has reached the point where the question is not so much whether women are good inventors but which of them stands at the head of the inventive class. Subject to the usual disputes that arise whenever one woman is placed ahead of another, Miss Beulah Louise Henry



BRIDGE RE-VIEW, CONT. Above. Henry Hudson Bridge, New York City. Right. Tilla-mook Trestle, Oregon

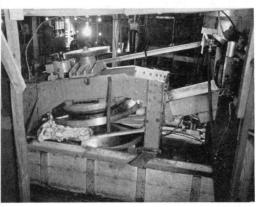




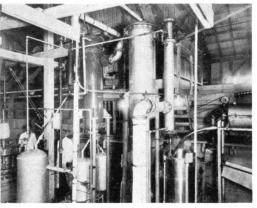
PRESERVING THE FLAVOR

. . of citrus fruit juices and other foods is the object of the new Stero-Vac process shown here in four successive steps. Aim of this canning method is to sterilize the juice and not at the same time to cook it - to give the customer fresh-flavored grapefruit juice, for example, not grapefruit soup. The Stero-Vac is designed to accomplish this ideal by (1) removing oxygen from the fresh juice as quickly as possible because of evidence that oxygen affects the keeping quality; (2) by heating the liquid so quickly and for so short a time that it is sterilized but not cooked — a procedure roughly similar to the familiar quick freezing.

Above is shown the first stage — the grating machine used in the mechanical extraction of the citrus fruit juices

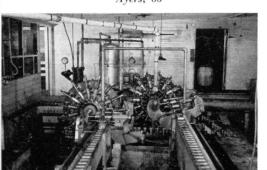


Second stage. The continuous press for squeezing out the juice



Third stage (above). The de-aerating unit which boils the juice under high vacuum and, consequently, at a low temperature. Result: removal of oxygen

Fourth stage (below). The turreted Stero-Vac machines which flash-heat the juice in the final cans in the virtual absence of air by the injection of steam, then seal the cans and deposit them on the quick-cooling lines shown in the foreground. The promising process, sponsored by Crown Can, has been developed by S. Henry Ayers, '05



seems to qualify, for the moment, as "First Lady" in inventions. For the past dozen years, she has earned the admiration of the examiners in the United States Patent Office. In fact, they have been granting her patents ever since she invented a vacuum ice-cream freezer at the age of 15. Her patented inventions today total more than 50 and are by no means limited to any particular field. Stenographers, seamstresses, children, and housewives can all be grateful for her inventive

For the typist, there is the Protograph, which obviates the necessity for carbon paper in making copies. Four copies can be made at the same time as the original, and the attachment is not a permanent fixture of the typewriter but can be detached at will. Last spring Miss Henry perfected an adding machine which will operate like a typewriter, and more recently she has been working on a device which will prevent duplicate and triplicate copies from slipping. This is valuable when perfect alignment of the copies is essential. Her invention involves the use of pins in the roller.

Such a distinctly feminine accessory as the sewing machine has not escaped Miss Henry's ministrations. She holds a patent on a double chain-stitch machine that is bobbinless and, therefore, fast and that allows the use of finer threads.

Lifelike dolls have been commonplace for many years, but a new and important contributing feature is the use of inflatable rubber tubes to take the place of heavy fillings. This method of making lightweights out of heavyweight dolls is another of Miss Henry's patents. She has added to the demand for feminine ensembles by her invention of a detachable-cover umbrella, which will permit every dress to have its matching umbrella. Unique (though it sounds fearsome to us) among the inventions for which she has received patents is a bath sponge which holds its soap and thus efficiently churns its own lather.

To round out the case history of America's foremost woman inventor, we must add that she is a native of North Carolina; an adopted daughter of New York, where she has her laboratory; that she derives her surname directly from Patrick Henry; is a descendant, on the distaff side, of President Harrison and a granddaughter of North Carolina's former Governor Holden; that she professes an utter lack of knowledge of scientific fundamentals; has been known to attribute her discoveries to an "inner vision"; and is sometimes called the "Lady Edison."

Engineers in the Great Depression

T the request of the American Engineering Council (one of several bodies concerned with the task of defining and improving the status of the engineering profession), the United States Bureau of Labor Statistics recently undertook to investigate broadly the effect of the last depression on engineering employment. Its conclusions are based on the replies of the 52,589 engineers who had the time and inclination to fill out the Bureau's long questionnaire (120,562 didn't).

As far as the professional classes, as a group, are concerned, it appears that the last depression was their first. To quote the survey: "As far as is known, the recent depression was unique in its disastrous repercussions upon professional groups. Unemployment has for decades been recognized as a major form of insecurity affecting wage earners, and fairly reliable data concerning this have been made available from time to time. Precise knowledge as to the extent of the depression upon professional workers has, however, been lacking.'

To a great degree it is still lacking, for, as far as this country is concerned, only the engineering profession has as yet been examined. Comparison with men in other fields and of equal training is, therefore, impossible, but at the end of 1932, when approximately one worker in every four was unemployed and when the proportion of jobless in the manufacturing trades stood at about 35% of the available labor supply, one engineer in every ten was without work. What happened to the ordinary workers during the five lean years ending with 1934 is in large measure a statistical mystery, but at least one engineer in every three was forced to hunt once or oftener for a new job.

Nevertheless, engineers in this country fared better than many abroad. France in 1934 could furnish work for only 75% of her engineers, while estimates for Switzerland showed that about 30% of her technically trained men (including men in architecture, chemistry, and similar fields) were unemployed. Unimpressed by the 15,000 workless experts in France or the 7,000 in Switzerland, agricultural (Continued on page 148)

Believing Is Seeing

By What Mechanism Do We Perceive Depth?

By R. P. Johnson

SHOULD THE OLD ADAGE BE

REVERSED TO READ: "BELIEVING

Is SEEING"? CHECK FOR YOUR-

SELF BY EXAMINING, AS DIRECTED

IN THIS ARTICLE, THE ILLUSTRA-

TIONS ON THE NEXT TWO PAGES

THE discussion on stereoscopic effects which appeared last spring in the March, May, and July issues of The Review naturally arouses curiosity about depth perception in general. By what mechanism does the human mind judge, from the evidence presented to the two eyes, that the surrounding world is three dimensional, and how is it able to assign, with considerable precision, various distances to various objects in the visual field? These are questions which have beguiled psychologists for many years, have led to some interesting experiments, and have received a fairly definite answer.

In the optics of the seeing process, there are patently several factors which might contribute to the perception of depth. One of these is the focus of the eye lens. Since the distance from lens to retina is fixed, the focal length of the lens must be changed to fit a changing object

distance. When the image of a near object is sharp on the sensitive fovea centralis, the lens is thick. To focus a more distant object sharply, the lens must be pulled out, by muscles attached to its edges, into a thinner shape. The muscular sensations going with this accommodation are a criterion by which object distance might be gauged. Anyone who has ever driven an automobile with one eye closed will recognize that, for the estimation of distance, there is decided advantage in seeing with two eyes. Two additional optical mechanisms aid binocular vision: First, there is the convergence of the optic axes, the rolling inward or outward of the eveballs so that the rays from the object which is focused will fall, in each eye, on the fovea. Second, there is the effect of binocular parallax. The two retinal images are slightly dissimilar, because of the spacing between the eyes. The image of any point nearer or farther than the point which is in focus will appear doubled, and the extent of this doubling will depend on the relative distances. Subconscious range finding, with the interocular distance as a base line, can take place.

lar vision? They have been separated from each other and from the other possible factors of depth perception, and their precision has been measured. First, we need some definitions. If a is the distance between the eyes, and d and d+p are the distances from the observer to two points directly in front of him, then $\eta = \frac{ap}{d^2}$ is an angle which measures the separation between the points. Let the observer estimate repeatedly which of the two points is nearer. If he is right M times and wrong N times, M-N/M+N is a measure of his accuracy. If M-N/M

+N is 0.75, the observer is doing a passably good job

How sensitive are these two gauges of depth in binocu-

of estimating the relative distances. The value of η for which this stereoscopic threshold is attained is called the stereoscopic acuity.

Stereoscopic acuity for binocular parallax alone has been measured by Langlands. 1* To avoid the assistance of focus and convergence, he illuminated the field with a flash of light so short that the observer had no time to make these accommodations. The observer was given two dissimilar retinal pictures, and from these data alone he was required to estimate which of two points in the field was nearer. The acuity thus measured turned

out to be about 15 seconds of arc. This means that binocular parallax alone is, roughly, just capable of distinguishing between the nearer and the farther of two points, 10 feet and 10 feet 0.5 inches, or 100 feet and 104 feet, respectively, from the observer. Le Grand² has done a similar experiment on the stereoscopic acuity

for convergence alone. He used two point objects, one just above the other, in a dark room, and thus avoided the contribution of parallax. The value he obtained was about 18 seconds of arc, which corresponds, roughly, to a separation of 0.6 inches at 10 feet.

It is important to notice that these factors in depth perception depend, finally, on the past experience of the observer. The muscular sensations going with convergence and focus, and the disparity of retinal images involved in parallax judgments certainly are measures of depth, but they have to be calibrated in terms of other experience, such as the experience of reaching for the objects or walking to them, before they are useful. In other words, there is no reason to think that the experiments of Langlands and of Le Grand would have had any determinate result had the observer been a babe new born.

When the experience of the observer is explicitly taken into account, we can list several other aids to depth perception which concern experience alone and involve no muscular adjustments or comparison of dissimilar images. One such aid is ordinary perspective, the diminution in size of the retinal image as the object recedes from the observer. If the retinal image of a man is larger than the retinal image of a house, there is a strong prejudice that the man is nearer than the house, since it is common knowledge that men usually are in fact not so large as houses. Another such aid is the known relationships among various parts of the visual scene. It is not difficult to tell, at a distance of several hundred yards, whether a man is standing just in front of a rail fence or just behind it. Focus, convergence, and parallax are far too inaccurate to assist appreciably

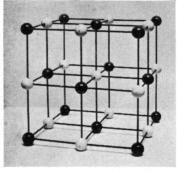
^{*} Numbers refer to notes at end of article.

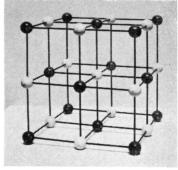
(b)
(c)
(d)

(a)

FIG. 1. TRY THESE ON YOUR EYES

The stereodiagrams above, devised by R. J. Trump, seem to indicate that perspective is more powerful in depth perception than is parallax. Examine them in a stereoscope and see whether your observations check those reported on page 123



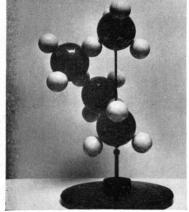


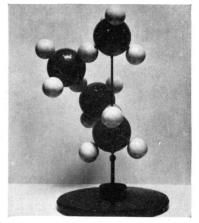
Transactions of the Optical Society

A. ROCKSALT TYPE

FIG. 2. DO THESE TURN WRONG SIDE OUT?

When the crystal model stereograms above and below are transposed (the left exchanged for the right) and viewed in the stereoscope, do you get the effects described on page 136? (Reproduced by permission of Adam Hilger, Ltd.)

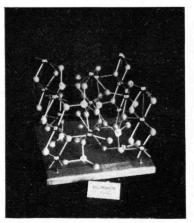


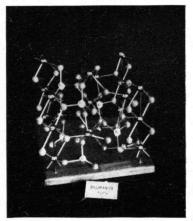


B. QUARTZ

in this estimate; the whole judgment is based on past experience that men are continuous vertically, whereas fence rails are continuous horizontally. A third aid is our experience with shadows: Bas-relief is easily mistaken for intaglio when the illumination is from below, rather than from above as it normally is. Still a fourth aid, highly useful when the object is far away, is the haziness and coloration introduced by the atmosphere. Distant trees and distant mountains look blue, their details are blurred, and we have come to associate these peculiarities with distance. In estimates based on this factor, more than in judgments which involve pure perspective, known relationships, and shadowing, the appeal to experience is apt to be a conscious one. There is a story of a Londoner who crossed the Atlantic and traveled by train, night and day, to a ranch in Montana. After breakfast on his first morning there, he set out alone for a walk to a little hillock which appeared to be a mile or so away from the ranch house. His host overtook him at noon, still many miles from the "hill." He was standing on the bank of a little stream about three feet across, stripping off his clothes. To his host's startled query, he answered determinedly that he was preparing to swim that river.

We should like to separate these objective depth factors from one another and from the muscular accommodations, and determine the effectiveness of each of them in turn. This is not easily done. It proves to be simpler to set them in contradiction with one another than to isolate any one of them. Such contrast experiments should give us the information we want. If a situation can be devised in which convergence, for example, tells us one story about the depth relations in the field, while perspective tells us an entirely different story, then we can judge, from which of the two accounts the mind accepts, whether convergence or perspective is given greater weight in the final estimate of relief. The actual world is not a suitable place for such tests, since here all the depth perception mechanisms tell consistent stories. Focus, convergence, perspective, order of occultation, shadows, and hue—all send in pieces of information which fit without halt into the final perception that A is more distant than B. No one of these factors submits a dissenting minority report, which has to be considered and either accepted or rejected. For getting such conflicting evidence, stereoscopic pictures are convenient test objects. It is not necessary to discuss the various technical subtleties involved in the making and viewing of stereoprints. For the present purpose, the left-hand picture of a stereoscopic pair is what the left eye would see, the right-hand picture what the right eye would see, if the observer looked directly at the scene which has been photographed.





C. SILLIMANITE, Al₂ SiO₅

JANUARY, 1938

Simple and striking experiments on depth perception, using stereoprints as objects, have been done by Trump.3 In the first test he arranged that the two muscular accommodations, focus and convergence, should give him conflicting reports. The pictures were viewed directly, without a stereoscope, and the distance between them was changed, while the distance from the eyes to the plane of the pictures was kept fixed. Trump found that he could get stereoscopic fusion and a good impression of depth when corresponding points in the prints were 8.5 centimeters apart — somewhat farther than the interocular distance — and that the relief impression was unaltered as the pictures were brought nearer together and finally interchanged, so that he was looking at them cross-eyed. He concluded that the interrelation between convergence and focus, always present when the real world is viewed, but here badly perverted, has no prominent role in depth perception. In this experiment the focus had been kept fixed while the convergence was varied from walleyed to cross-eyed. To check the conclusion, a complementary test was made in which the convergence was kept fixed while the focus was widely varied by means of telescope lenses between the eyes and the prints. Again, no change in the sensation of relief was experienced.

With focus and convergence thus ruled out, parallax and perspective are left as the most important factors. To test the relative powers of these two, Trump prepared the set of stereodiagrams shown in Fig. 1. In a the dots are so disposed that the parallactic effect, when they are viewed in a stereoscope, should place them in the order C E F B G D A away from the observer. No disturbing elements are present: The mind is dependent on parallax alone for whatever judgment of depth it forms. Actually, it is nearly impossible to get any clear sensation of relief, or even to make the points fuse satisfactorily and stably into a single stereoscopic set. In b a bit of perspective is added, consistent with the parallax. Fusion and depth perception immediately become much easier. In c more perspective aid is furnished; in d, still more. The improved relief sensation, in passing down these four sets, is marked. Patently binocular parallax alone is a rather ineffective indicator of depth, unless it is aided by some perspective system. It is then interesting to see whether parallax is an effective negating control when it is set in conflict with perspective. The final pair of diagrams in Fig. 1 tests this question.

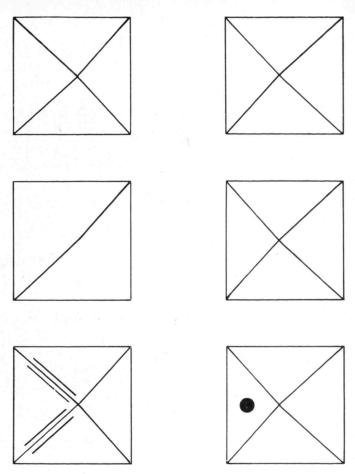


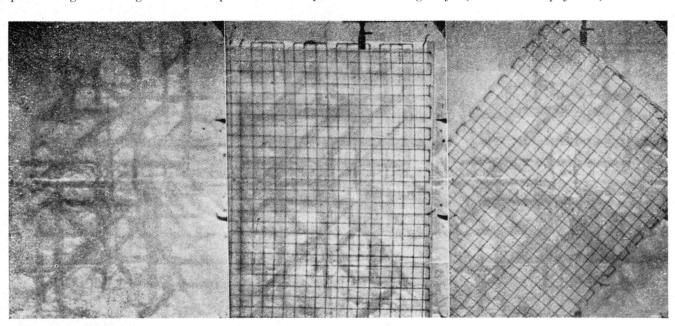
FIG. 3. THE DOMINANT EYE

In viewing stereoscopic pictures, either the left or the right eye tends to dominate the whole field of view. Sometimes first one eye and then the other becomes dominant. These diagrams illustrate this rivalry between the eyes. See page 137

The parallax is the same as in the preceding sets, but the perspective — the heights of the vertical lines and the order of hiding of the planes — has been made to give exactly the opposite suggestion about the relative distances from the observer to the corners. Some observers state that this pair, in the stereoscope, looks flat. Most observers report a good sensation of relief, in accord with the perspective. Almost no one reports an inverted relief that denies the perspective in order to be true to the parallactic evidence.

This last experiment can easily be extended by anyone who has a stereoscope and some prints which he does not highly prize. If a pair of prints is cut apart and transposed in the stereoscope so that the left eye sees the picture that the right eye (Continued on page 136)





Silk Purses from Sawdust

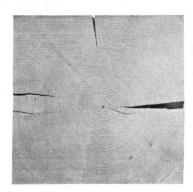
From the Test Tube, the Microscope, and the Slide Rule Comes a Revolution in Wood

By Albert G. Dietz

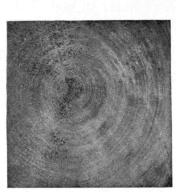
OOD, for thousands of years used very largely as it came from the tree, is today being subjected to searching inquiry by chemists, physicists, and engineers, who have combined their skills to improve upon its outstanding qualities, to overcome its drawbacks, and to find new forms in which to put it to use. Much of this work is carried on by specialized research organizations. Outstanding among these, in both scope and accomplishment, is the United States Forest Service's Forest Products Laboratory at Madison, Wis., where a concerted attack upon the problem of better wood utilization is being pushed forward upon many different fronts. Out of this fairly recent collaboration of the test tube, microscope, and slide rule have already come revolutionary developments, and others, now embryonic, promise to attain considerable magnitude. Some of the most recent and promising, which will be briefly discussed here to illustrate the activity in this wide field of research, are the following: plastics from wood waste, chemical seasoning, control of shrinkage, extension of glued wood construction, fire-resisting treatments, and improved timber connectors.

Screaming saws every year pile up mountains of sawdust, symbols of the great waste which has always characterized the lumber industry. Innumerable attempts to utilize this potentially valuable waste material have usually resulted in signal failures or makeshifts, such as packing for the local icehouse or, more recently, fuel for

specially constructed boilers. Papermakers have had little use for it because they have to be choosy about the sizes of fibers in their product and the species which they employ. The plastics industry, in the meantime, has put some sawdust to work, but only as a filler for the artificial resins which are the industry's foundation. The raw materials for the resins themselves comefrom other sources.

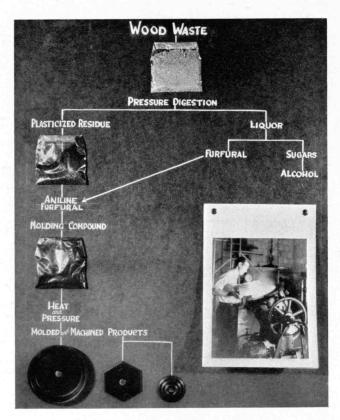


UNTREATED



TREATED

Air-seasoned Douglas fir tends to check when kiln-dried as shown in the block on the left. The right block was treated in a hot salt solution for several days. Result: elimination of checking, better appearance, strength, salability

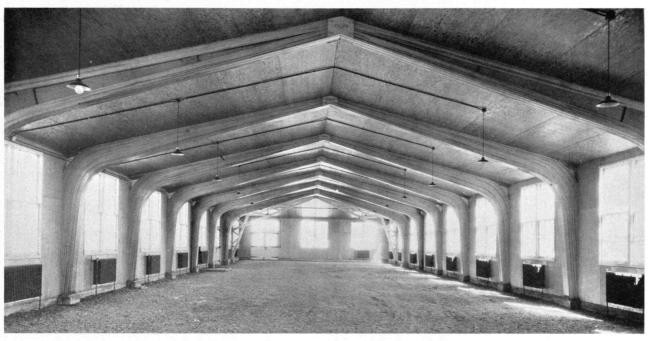


INTO SOMETHING RICH

For years wood waste has been waste, good for almost nothing. Now synthetic chemistry is on the way toward making figurative silk purses out of sawdust. One example is the new, cheap plastic developed by the United States Forest Products Laboratory

Now lignin, which is wood's chief constituent next to cellulose, can be made to form an artificial resin, rather brittle in the pure state but considerably strengthened by the addition of suitable fibrous fillers, one of which turns out to be cellulose. Wood technologists, casting longing eyes on the million tons of lignin dumped yearly by pulp mills and on the sixty million annual tons of logging and sawmill waste, have diligently sought for a satisfactory way to convert these wastes into plastics and have finally discovered a process which accomplishes this transformation in a few comparatively simple steps.

Sawdust is cooked under high pressures and at elevated temperatures in the presence of dilute sulphuric acid or aniline, the result being a black molding powder which, when washed of the sugars formed as by-products, can be ground and formed under high pressure into various shapes. The aniline method yields a higher percentage of molding powder, but materials are a little more costly. By the adJanuary, 1938



BORROWED FROM THE AERONAUTICAL ENGINEER

Walls and roof of plywood in this building of the Forest Products Laboratory utilize the stressed-cover principle of the airplane wing.

The arches are shop-fabricated laminated wood

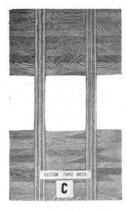
dition of various plasticizers, such as furfural, the properties of the resulting plastic can be considerably modified, but in any event the final product is a hard, dense, jet-black, glossy material, stronger than the original wood. Different effects can be obtained in the final step by pressing pigments, fabrics, and wood veneers into the surface, or by painting, enameling, or lacquering.

Chemistry and physics have been called upon to reduce another potent source of loss, that of degrade resulting from splits which develop in timbers upon drying from the green or freshly cut condition. Beyond a certain point, wood shrinks in direct proportion to the amount of water withdrawn, the amount of shrinkage being negligible parallel to the wood grain but of considerable magnitude perpendicular to it. When a timber dries, water naturally leaves the surface layers first, causing these to shrink. The interior, however, still contains practically all its original moisture, retains its original volume, and resists shrinkage at the surface, thereby inducing severe stresses which often split the surface layers. These splits are called "checks" and become progressively deeper as the timber dries. In order to prevent checking it is necessary that the surface should dry only slightly more rapidly than the interior. This necessitates excessively long drying periods for large timbers and, in general, for heavy, dense species, regardless of size. Even so, certain kinds of oaks, for example, check so badly even with the utmost precautions that they are rendered practically worthless.

Since the difficulty lies in the fact that the surface layers dry at a faster rate than the interior, any treatment of the wood which could reduce this surface rate would tend to equalize drying throughout the piece and eliminate the stresses which cause checking. Every highschool chemist knows that the addition of ordinary table salt to water reduces the internal pressure which

causes vapor to form, that is, reduces the vapor pressure. Timber physicists, noting this fact, decided to attempt to retard the surface drying rate of wood relative to its internal rate by impregnating the surface layers with salt solutions. This was accomplished by submerging timbers in a hot, aqueous solution of salt for several days, during which time the solution diffused into the timber, becoming less concentrated as it worked its way inward and finally tapering off to zero. These timbers were then placed in dry kilns, and the moisture content was reduced by usual methods, except that the drying process was accelerated, a procedure which ordinarily would be disastrous. The results were all that could be asked. The drying rate was not only equalized throughout the piece but it was even possible to reverse the normal condition, cause the interior to dry more rapidly than the surface and actually produce bad internal splits. With a properly balanced condition, however, no checks of any kind developed, even in species normally difficult to handle. Fine structural Douglas fir timbers which usually required at least two months of careful seasoning for best results were brought down in 34 days, eight of which were spent in the salt bath. Even more striking was the successful seasoning in 36 days, without degrade, of certain oak species formerly calling for 225 days of careful handling, with highly uncertain results.

The process, as it is now being commercially tried, consists of a preliminary bath of several days in a chemical solution, followed by kiln drying. The bath does not lengthen the total seasoning time since the timbers' interior, which is the vital spot, loses moisture to the bath because the latter has a lower vapor pressure. Successful commercial application of chemical seasoning may convert great stands of trees, now considered weeds because they cannot be seasoned, into valuable building and cabinet woods. Even more important should be its





SHOWING HOW
... fabricated wood
arches are built up of
glued pieces

effect in reducing the great annual loss from degrade, which is the result of wood's tendency to split upon drying.

The old problem of swelling and shrinking is the most serious and difficult one facing wood technologists. Under practical conditions, surface coatings like paint and varnish can only retard the rate at which moisture comes and goes but cannot prevent either its entrance or its exit; complete control involves getting right into the complex structure of the wood itself.

Wood structure may be visualized as follows: Imagine an agglomeration of innumerable small, rather irregular boxes or chambers (each having its separate walls) to be massed and held together by a somewhat flexible binder which fills the spaces between chambers. The walls of each chamber are com-

posed of loosely laid blocks which stick to the binder and are held in place by it, the interiors of the separate chambers being mainly open space. Because the blocks composing the walls are not immovably bonded together, it is possible to force other substances between adjacent blocks and wedge them apart, thereby causing the dimensions of the walls to increase and the volumes of the chambers to become larger. Since all the individual chambers increase in size, it follows that the whole agglomeration also increases in volume, or swells. Conversely, when these foreign substances are withdrawn, the blocks draw together, the chambers shrink, and the whole agglomeration becomes smaller. However, should the spaces between blocks be filled with a dense cement adhering firmly to the blocks, it would no longer be possible to force them apart by wedging in other substances, and changes in volume would be eliminated.

This picture serves as a simplified representation of swelling and shrinking in wood. The boxes, or chambers, are individual wood cells, the blocks are blocks of cellulose, and the binder between chambers is the lignin which holds the wood cells together. When water enters these cells, individual molecules of water work their way by capillary attraction between the cellulose blocks, force the latter apart, cause the cells to increase in volume, and make the wood swell. Naturally, when the water is withdrawn by evaporation, the wood shrinks. It remains, then, to find a good cement which will adhere firmly to the blocks, fill the spaces between them, and prevent the entrance of water into these spaces. Whether or not water fills the interiors of the cells is immaterial; it is the spaces between cellulose blocks which are important. Finding such a filler, though, poses a pretty problem. There are plenty of materials which will bond firmly to the cellulose blocks, but the very materials which have a strong affinity for wood also have a marked affinity for water and are, as they stand, of little value as moisture-excluding agents. The way out of this difficulty is presented by the possibility of making these materials water insoluble after they have bonded with the wood.

To date the most promising method of so doing consists of impregnating the wood with a mixture of phenol and formaldehyde (which have a very strong affinity for wood), together with a suitable catalyst dissolved in water or alcohol. After impregnation the solvent is slowly evaporated, during which time the phenol and formaldehyde work their way into the fine interstices between cellulose blocks. Curing at the temperature of boiling water then converts the phenol-formaldehyde mixture into a water-insoluble artificial resin of the type made common by the plastics industry. Antishrink efficiencies as high as 70% have been attained, together with improvement in some other wood properties, notably hardness and compressive strength across the grain. However, the process is still a long way from being economically feasible since it is about ten times as costly as it should be to meet commercial needs. On the other hand, much fundamental work has been done, and with a drop in the cost of raw materials the day of sticking doors and windows may begin to draw to a close.

To readers of The Review, plywood is no new subject. It has become a familiar, everyday material, used for everything from concrete forms to Ping-pong tables, and its uses have been greatly expanded by better methods of manufacture and by the advent of new, improved glues. Because plywood provides a material nearly homogeneous in both directions, provides better nailability. decreases shrinking and swelling, and is made in large sheets, it is coming into increasing importance as an engineering material. Among engineering uses may be mentioned plywood webs in built-up timber girders and plywood gusset plates in timber trusses and other framed structures. Gussets of this kind are indeed something new in timber design because, until the coming of modern timber connectors and structural plywood, such construction was not practicable.

Since plywood as an engineering material is very new, much has still to be learned about it from both experimental and theoretical standpoints. For instance, plywood is made of layers of wood with grains of successive layers at right angles to each other and is nonhomogeneous in cross section; therefore, it modifies the usual mathematical theory of beams and plates, which assumes homogeneity. In order to determine and, more important, to predict its properties, more must be known about the transverse properties of wood itself, particularly its modulus of elasticity and tensile strength. Experimental and mathematical work now being done should lead to a working theory of plywood action, which will take the place of present more or less empirical rules.

Prefabrication, that vociferous infant of prodigious promise born a few years ago, now settled down to become a sober and hard-working little industry, has produced many bizarre creations and a few of real merit. Among the latter few must be listed those using plywood, in which it is made to act both structurally and as covering material. To accomplish this a leaf has been

January, 1938

borrowed from the books of the aeronautical engineers who, to secure great strength and lightness in airplane wings, make the covering act integrally with the ribs, so that the whole wing is, in effect, one big beam. This stressed-cover principle is applied to the making of wall and floor panels by both gluing and nailing plywood covering to the joists and studs in place of ordinary boards and lath and plaster. Floors only six inches deep so built have proved to be as strong as ten- or twelveinch ordinary construction, and wall panels a little over two inches thick have shown 16 times more resistance to lateral racking (such as occurs in high winds) than is shown by ordinary construction. The problems confronting prefabrication are much more complex than the mere making of panels in a shop (a relatively simple procedure), but the few prefabricated houses commercially on the market are to a considerable extent based on the use of plywood.

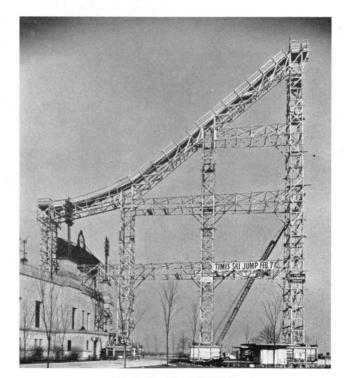
When the builders of old-time covered bridges shaped their big, curved bowstring timbers by bending successive layers of planks into position and pegging them there with hard wooden pins, they helped pioneer a type of construction which is growing in importance, that of laminated wood. In laminated wood, as contrasted with plywood, the grain in successive layers all runs in the same direction. The simple facts that a lath will bend more easily than a two-by-four and that the thinner the piece the more it can be bent without breaking, make it possible to fabricate large, twisted, and bent members by gluing together a number of smaller, thinner pieces which can easily be formed to the desired shapes shapes impossible to achieve with solid timbers even by steaming. Numerous articles of daily use, such as furniture with bent members and curved surfaces (among the oldest are grand piano cases), testify to this kind of construction, but the engineering possibilities are probably of even greater interest.

In Europe, where necessity has brought careful utilization of wood, laminated arches and beams of economical cross section have long been in use; examples of glued bridge arches 20 to 25 years old and in excellent condition are extant. One of the most striking examples, however, is a service building, recently erected by the Forest Products Laboratory, in which both laminated construction and plywood were used to fullest advantage. In order to obtain maximum clear space inside, three-hinged arches were fabricated, each half consisting of a boomerang-shaped laminated member, the haunches made deep to resist greatest bending, but the ends tapered off to afford economy of material with maximum clearance. The best laminations were placed so as to resist the greatest stresses, weaker pieces being reserved for points of lower stress. A variant of this construction consisted of boxed members with laminated top and bottom flanges and plywood webs. By building the roof of boxed panels using the stressed-cover principle previously mentioned, a light but strong edifice was finally achieved.

Some of the advantages of laminated timber members have already been indicated: the use of better grades of wood where stresses are greatest and the possibility of shaping members for maximum convenience and economy. Some European practice even calls for the making

of I shapes to put the greatest mass of wood at top and bottom. Further, because thin boards of the structural softwoods can easily and quickly be seasoned without serious checking, not only is the seasoning time of large members greatly reduced but checking is either entirely eliminated or rendered harmless by proper placement of checked laminations. Similarly, knots, which may seriously impair the strength of structural timbers, can be rendered harmless by placing them at points of least stress. Although it has been customary to use only one species of wood in building up laminated engineering members, there is no reason why different species should not be pressed into service — dense, strong varieties being used where they will be the most effective, and lighter pieces where great strength is not essential.

Like plywood, laminated wood brings its own special problems. Our present methods of analyzing laminated beams, particularly that large class of keyed rather than glued beams, are faulty because in one breath the assumption is made that a laminated beam is the same as a solid beam, and in the next breath this assumption is denied. Where keying is efficiently done, as it is with modern connectors, tests have shown this analysis to be insufficient. The problem of cutting laminations with a minimum of sawdust waste also arises. Whereas sheets for plywood are sliced or unrolled on a lathe, with practically no waste, boards and small timbers for laminated members must be sawed and surfaced, with a considerable amount of waste in sawdust and shavings. Finally, while the proper arrangement of laminations assures a member strong in bending, it does little or nothing about shear, which is often the controlling factor in short beams. (Continued on page 140)



TIMBER STRUCTURE

. . . need no longer be clumsy and wasteful. The use of timber connectors, resulting in stronger joints, is making possible graceful, economical bridges, towers, and buildings of wood

The Music of the Future

Will It Be Enriched or Impoverished by Science?

By STERLING LANIER

T the time of the commencement of this article the writer is listening to a series of Bach fugues on the phonograph. An attempt at such a moment to review the impact of science on music seems as unappetizing as would be a dissertation on the cell structure of a chicken to a would-be consumer of a wellcooked, dollar-and-a-half chicken dinner. Nevertheless, musicians, esthetic epicures, are apt to dismiss casually most aspects of this impact, assuming that all that science will ever be able to do in this most subtle and exacting of the arts may be summed up by the terms mechanical improvements and accurate explanations of existing musical phenomena. That the scientist may, in the future, replace their art with scientifically foolproof instruments, complicate their scales to a point where intricate mechanisms will supersede the limitations of the human body, and even dictate their esthetic standards — all these are possibilities of which the average musician is not sufficiently aware. To say that these changes are a thing of the too distant future is begging the question, and it is to be remembered that such noteworthy men as Stokowski and Toscanini are among that small group who are devoting their efforts to using, rather than rejecting, the contributions of science.

Tremendous strides have been made in some divisions of this scientific investigation into music; other aspects have so far proved impregnable. We may approach the whole question in at least four different ways, which I shall refer to as the constructional, the mechanical, the technical, and the esthetic. The first of these divisions should be of vital importance to every musician, since it may affect even his means of livelihood. Primarily, it concerns the development of new instruments, and by new I mean to imply those which, by the use of totally different means, may produce completely different sounds from any the human ear has ever heard.

So far only three ways of producing musical sound have been discovered — by vibrating columns of air as in wind instruments, by vibrating strings, and by vibrating solids. But when electricity enters the field, new possibilities arise. One has only to consider the successful Hammond organ to recognize the advantages of this new force as a tone producer. The organ, formerly prohibitive in size and cost for the average individual, is now within the reach of many more people as a result of electrical development. The Hammond organ can produce even more effects than some of the finest pipe organs.

Professor Arthur C. Hardy, '18, of the Institute gave, some seven years ago, a demonstration on a type of electrically motivated organ still simpler than the Hammond. While the latter is a complicated system of interrelated rotating spindles, Professor Hardy's instrument is actuated by rays of light passing through concentric

sound tracks photographed on a glass disk. These rays of light impinge on a photoelectric cell which generates current vibrations similar to those of the sound curves. These currents are then amplified and converted into sound by an electrically controlled, vibrating diaphragm. The shutters through which the light passes are located one in front of each sound track and are controlled by keys such as those used on an ordinary organ or piano.

The sound tracks on these glass disks may include as many harmonics as desired. Since the individual tone color of any instrument is a result of a particular blend of harmonics, the tone of any instrument may be reproduced by a proper combination of these in the sound tracks on the disk. While only one tone color was placed on each disk in the experimental model of Professor Hardy's organ, there are no outstanding difficulties precluding the building of an instrument which will use, simultaneously, as many of them as desired. By proper combinations of harmonics in recording the sound tracks, new tone colors, corresponding to no known instruments, may be produced. Furthermore, exact accuracy of pitch in the even-tempered or natural diatonic scales is assured, since the sound tracks on the disk may be accurately adjusted. Unlike the pipe organ the Hardy device is foolproof because the quality can be built in, relieving the performer of the responsibility of producing good tone by means of his own technical skill, a factor which has discouraged many a budding musician. Finally, it will allow any person to have the music he individually wants — be it good, bad, or indifferent as judged from accepted standards - since all he need do is have the particular disk made that will satisfy his own esthetic requirements.

The electric organ is only one of the many possible new instruments. The Thérémin-Vox, the tone of which musicians describe by such adjectives as thin and weird, is well known to most people. But so far, it must be admitted, when judged from a practical point of view these instruments, with the exception of the Hammond organ, have made virtually no impression on the musical world. Other mechanical devices, such as airplane propellers and player pianos, have made their appearance in modern orchestras, but none has found a permanent place.

Yet a second class of constructive instruments may prove of tremendous value to teachers and students of music. They are not to be used as esthetic criteria but merely as aids to effectiveness in technique. Science can measure music in various ways, and often the terminology of the scientist is more exact than that of the musician, a fact which may enable the musician of the future to speak positively where now he can only vaguely generalize. Audiometers, to test musicians' accuracy and powers of hearing; adjustable soundproof

rooms, in which to conduct tests on the effects of reverberation; projection oscilloscopes, which throw a sound curve on a screen in terms of light visible to the performer's eye while he is playing and which can be photographed for more detailed study — all these and other devices will give to students, teachers, or performers accurate information as to their own effectiveness.

Turning now from the constructional to the mechanical advance of science into the field of music, we find practical and commercial considerations of the utmost importance. A very few facts will serve to prove this statement. In this division are included such things as radio transmission, acoustical researches, and improve-

ments in already existing instruments.

Radio and the broadening in musical horizons that has resulted from it need little comment. Suffice it to say that today it is possible to build a radio which will faithfully (and by this I mean so accurately that the most delicate instrument can detect no difference whatsoever between actual sounds and their reproductions miles away) reproduce any sound or series of sounds. Prohibitive cost is the only stumblingblock to producing such a radio commercially. Therefore, cheap and imperfect radios, which distort the original tones to a greater or lesser degree, depending on the range of wave frequencies they are built to transmit, are educating the public to an inferior brand of music. May not this public come to prefer and demand inferior music as a result, even though science can achieve near perfection in sound reproduction?

Researches in the field of radio transmission and amplification systems have, as well, made possible startling changes which may affect musical composition radically. Effects that composers of the past never dreamed of are now possible with the twist of a dial. Suppose, for example, a composer should desire the effect of one hundred clarinets. The cost of having and maintaining them on the staff of a symphony orchestra would obviously be prohibitive. Yet simply by placing a microphone before a single clarinet player and amplifying his tone one hundred times, while keeping the remainder of the orchestra at its usual level, the effect may be obtained with ease. Whereas now a section of 25 violins misses the mark of perfect unity in rhythm, pitch, and tone, one violin alone could do the same or

more work with perfect accuracy.

Other aspects must be considered. Few people realize that no two individuals in an audience hear exactly the same music, and that none of them hears what the orchestra on the stage is actually playing. Music is intensified by reflection from the walls, floor, and ceiling of any room in much the same way as light is intensified by reflection from mirrors or even walls of rooms. The total of a complicated series of reflections is what an audience hears, and no two people receive the same total. Science has shown musicians how to build halls which will produce accurately any desired amount of reflection. At present this amount varies from one and a half to two seconds as the proper time between the moment of instigation of a sound and the moment at which its last reflections have died away. Theoretically, a sound never ceases, but, arbitrarily chosen, the instant at which sound is only one-millionth of its original

intensity is considered that of complete cessation. Any musician who has struggled with the disadvantages of poor acoustics eagerly welcomes any contributions science has made in this field. Quite interesting and comprehensible to the layman interested in this subject is John Mills's book, "A Fugue in Cycles and Bels, which gives the results of the researches of the Bell Telephone Company in these and allied subjects.

Not so successful are the attempts to improve on already existing instruments. Pianos are a great deal more dependable today as a result of scientific contributions in construction, materials, and operation. Yet some older, handmade pianos, while less dependable. are often found to produce richer tones than the best modern ones. In most wind instruments metal has taken the place of wood, yet many musicians, while appreciative of the conveniences resulting from this change, mourn the loss of the wood tone which metal cannot reproduce. Stringed instruments have so far resisted all efforts at improvement, if we except such small items as devices for tuning metal strings and the metal strings themselves, which are preferred only because of their durability. Esthetic pleasure is such a variable quality that it is difficult to say whether these contributions are improvements or not. In general anything which will make for ease of operation is enthusiastically welcomed by musicians, provided musical quality is not sacrificed.

The third large division, what might be called the science of music proper, but which is here called the technical aspect of the subject, is concerned with explanations of musical phenomena, such as the nature of sound, relations of tones to each other in systems (scales), auditory means of perception, and related factors. Study in these fields is basic for any constructive work in the preceding divisions.

Only a few outstanding books have been designed to help us here. Notable among these are Helmholtz' "On the Sensations of Tone as a Physiological Basis for the Theory of Music" (1862), Miller's "The Science of Musical Sounds" (1916), and Yasser's "Theory of Evolving Tonality" (1932). Sir James Jeans's book, "Science and Music," just published, is a brilliant successor to these earlier volumes, and it was out of a review of it that this article has grown. It cannot be too easily read by anyone unacquainted to a moderate extent with both science and music, but Sir James is to be praised for bringing the subject nearer to the understanding of the general public. It is his expository skill particularly that is worthy of commendation.

If there are a few minor points which do not seem to have been adequately solved for the reader, the fault lies not with Sir James but rather with a lack of information, since scientists have not vet succeeded in probing all the secrets of music. It might be worth mentioning one or two of these. For instance, why (pages 49 and 50) do beats formed by the pure tones of tuning forks remain uniformly unpleasant all the way from slightly beyond unison to the next octave above, whereas those produced by violin strings (page 153) fluctuate wildly, unpleasantness almost disappearing at the intervals of a major third, a fourth, and a fifth? Possibly harmonics have much (Continued on page 145)

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Looking Back on 1937

DILIGENT readers of The Review — that admirable group which our enlarging editorial correspondence shows to be multiplying as The Review enters its 40th year — thoroughly appreciate that this last twelvementh spans a period of accomplishment remarkable in Institute history. But even a most casual observer of the march of events as reported issue by issue in our columns could hardly have misconstrued the tempo of the times as comparable to a state of doldrums.

Expansion of the physical plant, unprecedented in scope for two decades, took place. Equally memorable changes of consequence, however, are to be noted in directions other than additional stone, steel, and mortar: careful replanning of space allocation to attune the plant to a better usage, subdivision of duties and responsibilities to improve the educational administration, a renewed series of stimuli to the teaching and research esprit — and to an interest in student welfare — by the personnel who staff the plant. There were a number of notable additions to the staff, and the Institute put into full effect its plan for stabilization of enrollment, thereby assuring greater selectivity in admitting new students.

Then, too, the achievements of individual Alumni and instructing staff during 1937 reflected more than customary distinction upon Technology, while the interest of the alumni body in Technology's wellbeing was wholeheartedly reaffirmed by the response to an initial appeal during the closing months of the year for funds to provide adequate gymnasium and other recreational facilities - which, save for the dormitory drive of 1926, is the first general appeal for funds since the endowment campaign 18 years ago.

With this issue, the 40th an-

niversary number of The Review, the perspective of hindsight on the composite record of the old year becomes a possibility. Not with the single purpose of trying to round out the proportions of what has taken place but rather that it may

provide guidance and inspiration during the new year, we present in summation a few of the more striking items of 1937:

PHYSICAL PLANT

T the end of 1936 it was a closely guarded secret, A though, paradoxically, known to many individuals, that negotiations were pending for the sale of the remainder of the Boylston Street site in Boston, the Rogers and Walker buildings. Consummated by agreement of sale dated April 12, public announcement of the transaction was accompanied by that of a decision to erect an additional wing (Building 7), which, with a content of some 1,600,000 cubic feet, would form the largest increase to the main educational plant in Cambridge since completion of the present group in 1916, and the first addition since erection of the Eastman Research Laboratory in 1931. The new building, now well under construction, will house the School of Architecture when it is moved to Cambridge next June, and, because of its size, will relieve pressure in many other departments, as explained in The Review for November (page 33).

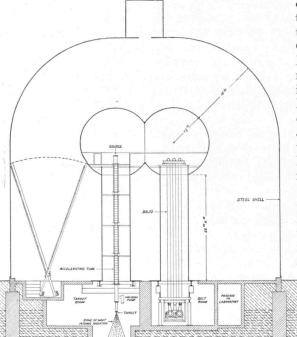
Reallocation of space in the present buildings was started last summer after a careful analysis of requirements. Important among the changes was the conversion

> of two top rooms in the big terminal pylons which mark the entrance to the Great Court from Charles River Road into admirable experimental lecture halls for classes in chemistry and hydraulics. Meantime, work was started on the remodeling of Room 5-330, the large lecture hall on the west side, for use as a branch library to serve the needs of five adjacent departments.

> Changes in the Department of Civil and Sanitary Engineering included space for a structures laboratory in which the research apparatus and model structures also serve as ex-

hibits of work in this field of engineering. Throughout the Institute eighty space changes have already been made, with fifty more in prospect for next year.

Coincident with the beginning of construction on Building 7, last midsummer,



HIGH-VOLTAGE NUCLEAR RESEARCH LABORATORY

The Van de Graaff electrostatic generator as it is now being reconstructed in its steel-domed housing. Note how radiation from its great x-ray tube projects downward into the earth

ground was broken for a structure to house the Van de Graaff electrostatic generator (see opposite page), brought to Cambridge from the estate of the late Colonel E. H. R. Green at South Dartmouth in October and now housed in its new steel-domed laboratory. Late in the autumn a new substation to house the 1,700-kilowatt motor-generator unit to supply current for the enormous appetite of the powerful magnet (see page 132) developed by Dr. Francis Bitter of the Department of Metallurgy was completed. Meantime work has started on the new wind tunnel which will equal in power (Reynold's number) and exceed in adaptability, any tunnel in America. It will develop wind velocities up to 400 miles an hour and simulate variations in barometric pressure up to theoretical altitudes of 35,000 feet, capabilities that presage advances in aeronautical engineering research.

As the year drew to a close, the Institute, faced by the need for large increases in power for instruction and research, made arrangements to purchase all its

electric power from the Cambridge Electric Light Company at a very economical rate, thus also avoiding a large capital investment for an addition to the power plant. The present plant will be used for heating purposes only and as a stand-by unit for use in emergencies.

Besides these structures for strictly educational purposes, 1937 saw the purchase of Riverbank Court Hotel for use as a graduate house. Thus, when more than 200 graduate students migrate next autumn from their present dormitory to the new quarters with accommodations for some 350 students, the old Graduate House will become available for at least 200 additional undergraduates. A long waiting list assures capacity occupancy of both houses.

Since last July, when plans for the development of a museum of the industrial arts and sciences were announced, much has been done to indicate the fascinating possibilities of the project. The Nautical Museum has been enlarged to accommodate additional exhibits, and several departments have coöperated in starting corridor exhibits illustrating work in the various sciences. Thus, the original plan of William Barton Rogers, the Institute's first President, for such a museum is taking tangible form.

Responding to this Technology building boom, even the Harvard Coöperative Society, which has long had a Technology branch for the convenience of staff and students, erected an attractive building of its own during the year. The "Technology Store," as its sign reads, stands directly opposite the Pratt School of Naval Architecture and Marine Engineering.

UNDERGRADUATE LIFE

NO more convincing evidence of the interest of our students in recreation can be found than the eager participation of 500 members of the M.I.T. Nautical



THE ARCHITECTURE BUILDING

. . . in mid-December with construction moving ahead steadily, despite record low temperatures. In the background on the right side of Massachusetts Avenue is the Riverbank Court Hotel, recently purchased by the Institute for a graduate house

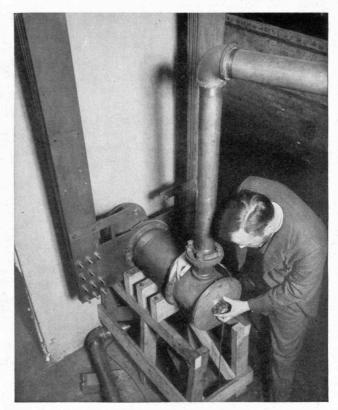
Association in sailing on the Charles River during the past year. Adequate facilities, including the 38 sailing dinghies, as well as notably efficient student administration, have given Technology first place in intercollegiate dinghy racing. Most of the students had never sailed before coming to the Institute. Now many of them are the most skillful small-boat sailors in the country. Impressive, too, was the 1937 150-pound crew which won the Joseph Wright Challenge Cup by defeating Harvard, Yale, Princeton, and Cornell last May. Altogether, the undergraduates had a year on the water that presages what may come on land when facilities are adequate.

FINANCES

THE fiscal year which ended on June 30 will be pleasantly remembered as one of greatly increased income over budget estimates. For the first time the Institute deliberately refrained from using its entire investment income for the year and set aside a substantial amount as an income equalization reserve fund. At the close of the fiscal year, the total book value of all Institute investments stood at the high of \$35,668,000, with a yield of \$1,774,000.

Capital gifts received by the Institute last year up to December 11 amounted to \$523,025.03. This figure does not include a large number of miscellaneous gifts, among which is the sum of \$37,500 from the Research Associates, applied directly to research and teaching. This sum, with the \$1,000,000 bequeathed by the late Charles Hayden, '90, adds significantly to Technology's endowment. The capital gifts included the sum of \$238,202 from the estate of Marion Wescott; \$110,485 from the estate of John W. Foster; \$96,200 from the estate of Francis H. Williams, '73; and \$46,600 from the estate of Arthur D. Little, '85.





IN TECHNOLOGY LABORATORIES IN 1937

Testing water tanks with synthetic earthquakes. The white shadowgraph in the right foreground represents an actual quake, and through an electrical system causes the table under the tank to move as the ground did in the actual quake

ADMINISTRATION

NEW deanship of humanities, an office envisioned in 1931 at the time the deanships of engineering, science, and architecture were established, was created in April. This officer has consolidated the portions of the curriculum devoted to cultural and social studies, principally through superintendence of the Departments of English and History, Economics and Social Science, and Modern Languages. The past year also witnessed division of the Department of Mining and Metallurgy into two departments. Mining Engineering includes petroleum production, while the Department of Metallurgy takes in ceramics. This department has given special attention recently to the development of courses in process metallurgy and of laboratories for continued investigation of the application of basic scientific principles to the production and treatment of metals, a field in which Professor John Chipman, who joined the Faculty in September, is an outstanding authority.

One of the most significant developments of the year was the creation of an industrial relations section in the Department of Economics and Social Science. The Section's objectives include not only instruction in a field of great importance but the gathering and study, as a public service, of all useful information on employer-employee relations in this and other countries.

Important among administrative advances during the year was the agreement entered into with the Research Corporation of New York, whereby this organization

Magnet developed by Institute metallurgists which produces a field of at least 100,000 gauss, the highest permanent field ever attained. The magnet is being used to study the behavior of matter at temperatures below one degree absolute

handles all legal and commercial aspects of inventions assigned to it by Institute inventors. In order to carry out the arrangement effectively, Research Corporation set up a Boston office. Thus was the Institute's admirable patent policy, formulated after exhaustive study of every aspect of institutional patent procedure, strengthened and extended for the protection of the individual inventor, the Institute, and the public against the exploitation of scientific and engineering discoveries.

RESEARCH

ONE of the Institute's most important contributions to science in 1937, was the completion of the 1,000,000-volt electrostatic x-ray generator designed by and built under the direction of Dr. John G. Trump, '33, of the Department of Electrical Engineering. The new unit, most powerful in the world, is now in regular operation at the Huntington Memorial Hospital of the Harvard Medical School in Boston, where it is being used for medical research and the treatment of malignant disease. A thoroughly dependable source of deeply penetrating, shortwave x-rays of intensity greater than the output of all the radium available, the generator is an outstanding example of the potentialities of coöperation among various fields of science.

Facilitated by a grant of \$85,000 from the Rockefeller Foundation in 1936, steady progress was made last year in the exacting task of designing and building the new and more powerful differential analyzer, the first model



STUDENTS DO RESEARCH

. . . as an integral part of their educational work at Technology. Here, in the strength of materials laboratory, a graduate student in civil engineering investigates the strength of the lining used in tunnel boring

of which established the Institute's reputation as a center for the solution of complex problems in mathematical analysis. Conceived by Dean Bush, '16, the new machine is being constructed under the direction of Dr. Samuel H. Caldwell, '25. Worthy, though small-scale, companions to the present analyzer are the simultaneous calculator — a machine developed in 1936 by Dr. J. B. Wilbur, '26, for solving multiple simultaneous equations, and now in regular operation — and the cinema integraph now being completed.

The earthquake research machine developed by Arthur C. Ruge, '33, in the seismology laboratory was used last summer for reproducing the motions of an actual earthquake to test the strong-motion earthquake recorders developed by the United States Coast and Geodetic Survey. This study is typical of the innumerable ways in which Technology places her resources at the disposal of national and local governmental agencies.

Another investigation in the same category was the study made for the United States Corps of Engineers by Dr. K. C. Reynolds, '25, to determine the changes in tidal currents and silting that will occur after the enlargement of the Cape Cod Canal to permit navigation by the largest ships. This eminently successful research was carried out in a large-scale model of the canal.

Important work was done by Professor A. V. deForest, '11, last year in the dynamic strength of materials laboratory, where he is studying the characteristics of metals and alloys under service conditions. The methods of stress measurement developed by Professor deForest

have contributed much to a better understanding of fatigue in metals. Notable, too, was the joint focusing of Professor Bitter's development of great magnets and Dr. Keyes' advances in low-temperature research on some fundamental spectroscopic, metallurgical, and chemical problems.

ACADEMIC

VARIOUS conferences and meetings beginning with the important and very successful International Housing Conference on Alumni Day made last summer one of the busiest in many years. The annual meeting of the Society for the Promotion of Engineering Education in June brought 1,500 educators to the Institute, and the subsequent Conference on Spectroscopy and the Symposium on Metals, to be followed in September by the interesting Food Technology Conference, first of its kind ever held, enriched the varied academic fare.

Special summer courses of singular interest to research workers drew a large attendance, indicating that many industries are alive to the importance of keeping abreast of advancing knowledge and new techniques. The course in practical spectroscopy, for instance, dealt with the application of this versatile tool of science to special problems in astronomy, biology, chemistry, physics, medicine, metallurgy, and engineering. Other courses gave instruction in the use of spectroscopic equipment and quantitative spectroscopic analysis, all under the direction of Professor George R. Harrison.

Dr. Ernst A. Hauser's course in colloid chemistry, the importance of which is widely recognized by industry, was well attended, as were the subjects in advanced strength of materials given by Professor John M. Lessels; principles of textile analysis by Professor Edward R. Schwarz, '23; and ceramics by Professor F. H. Norton, '18.

Important new appointments to the Faculty in 1937 were Lieutenant Colonel Charles Thomas-Stahle, '22, as Professor and Head of the Department of Military Science and Tactics; Lt. Col. E. S. J. Irvine, '22, as Associate Professor of Military Science and Tactics; Dr. John Chipman as Professor in Metallurgy; Dr. R. M. Cunningham as Assistant Professor in Business and Engineering Administration; Dr. H. W. Fairbairn and Dr. R. R. Shrock as Assistant Professors in Geology; and John T. Rule, '21, as Assistant Professor in Drawing.

The program in biological engineering, one of President Compton's important objectives in his plan for a greater Technology, was advanced when the Faculty adopted a five-year curriculum based on a suitable choice of studies in the physical, biological, and engineering sciences. Plans for further development of this project are under consideration.

Last year was the first under the new selective system of admission, whereby entering freshmen are limited to approximately 600, and similar stabilization ranges are set for second-year students allowed to continue in each course after the midyear examinations. Last September witnessed the entrance of the first class in which half the membership came from beyond the borders of New England. Furthermore, the year recorded the first \$350,000 of repayments to the Technology Loan Fund, which up until December 1, 1937, had loaned a grand total of \$1,094,422.90.





F. S. Lincoln, '22

STUDENT RECREATION

. . . was notably encouraged in 1937 by the launching of the Alumni Fund for building a gymnasium and other recreational facilities — a fund to which over 4,000 contributions have already been made. Completion of the campaign will mean relief to Walker Memorial (right) now overtaxed, and a development in sports for all, comparable to that inspired in sailing by the superb facilities (left) recently established for the Nautical Association

ALUMNI ACTIVITY

IMPRESSIVE was 1937's record of alumni activity in behalf of the Institute. The epochal report of the Alumni Committee on Student Welfare Objectives was the harbinger of the Alumni Fund Campaign for the enrichment of student life. This drive, alumni-initiated and alumni-managed, is moving toward its goal of providing a recreational and athletic plant comparable to the Institute's educational equipment and worthy of its students and Alumni. Will the turf-turning of 1937 as already recorded, be matched by the breaking of ground for the new project this year?

Organization of the Friends of the M.I.T. Library, a group composed of Alumni and others interested in making the Institute's library preëminent as a collection of scientific and engineering literature, was announced at a distinguished dinner in March. Since then there have been notable manifestations of a friendship certain to become increasingly valuable.

An index of the activity and interest shown by Alumni in their own bailiwicks is the number of club meetings for which speakers are obtained from the Institute. In 1937 that figure reached the astonishing high of 98. All but four of the 64 alumni clubs in the United States were visited by representatives from the Institute. With so many enthusiastic meetings over the land, with nearly 2,000 Alumni actively at work on the Alumni Fund, with the record of the largest Alumni Day to date, Alumni 1937 may be said to have kept pace with the Institute 1937 in going places. Reflecting this activity, the Alumni Association Office was expanded, its staff reaching a total of 11, including the Register of Former Students (which Association officers now supervise for the Institute) and The Review.

To make this report of achievement complete, we need only the record of *individual* achievement — a record obviously too extensive for recapitulation. To

indicate the whole, we can at least present a few examples, drawn almost by chance and without conscious discrimination from the 300,880 words on such achievements published by The Review in 1937. Elected to presidencies were: F. R. Hart, '89, Massachusetts Historical Society; S. B. Robertson, '99, B. F. Goodrich Company; J. C. Kinnear, '07, Nevada Mine Operators Association; W. Drake, '11, Electrical Research Products, Inc.; Thomas D'A. Brophy, '16, Kenyon and Eckhardt, Inc.; R. E. Wilson, '16, Pan American Petroleum and Transport Company, American Oil Company, and their subsidiaries; W. J. Scott, '18, New England Water Works Association. Among these should be named also two men who were reëlected to presidencies: Welles Bosworth, '89, University Club of Paris; A. A. Potter, '03, American Engineering Council. The permanent organization of the World Power Conference chose, as vice-president, O. C. Merrill, '05. Other outstanding vice-presidents are Howard H. Brown, '06, in the Society of Naval Architects and Marine Engineers and C. Camsell, '09, in the Geological Society of America.

Medals and prizes given to Technology men in 1937 came from near and far. Two that stimulate the imagination were presented to L. S. Cates, '02: Commander Ordre de la Couronne from Belgium and Knight of the Order of the Condor of the Andes from Bolivia. The Geological Society in England honored Waldemar Lindgren, Professor Emeritus, with their Wollaston Medal. Honors accorded nearer home include the Samuel Wylie Miller Memorial Medal of the American Welding Society, given to H. M. Hobart, '89; the Mary Clark Thompson Medal of the National Academy of Sciences, to A. W. Grabau, '96; a gold distinguished service medal of the Great Lakes Exposition in Cleveland to C. G. Abbot, '94; the Sylvanus Albert Reed Award of the Institute of Aeronautical Sciences to E. S. Taylor, '24; the Silver Medal (Concluded on page 150) NORTON ABRASIVES Variety-in abrasives and bond -that's one reason for Norton success in every cut-off operation. Expert Service is another reason - experts who can help you adapt these wheels to your job. Abrasive wheels are now recognized production tools for cutting-off and slotting operations—are doing the job more economically than other methods and leaving a finish that, in many cases, eliminates subsequent operations. Let Norton show what they can do for you. NORTON COMPANY, WORCESTER, MASS.

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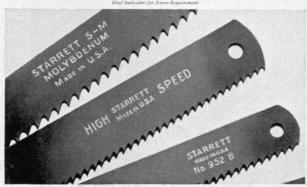
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BELIEVING IS SEEING

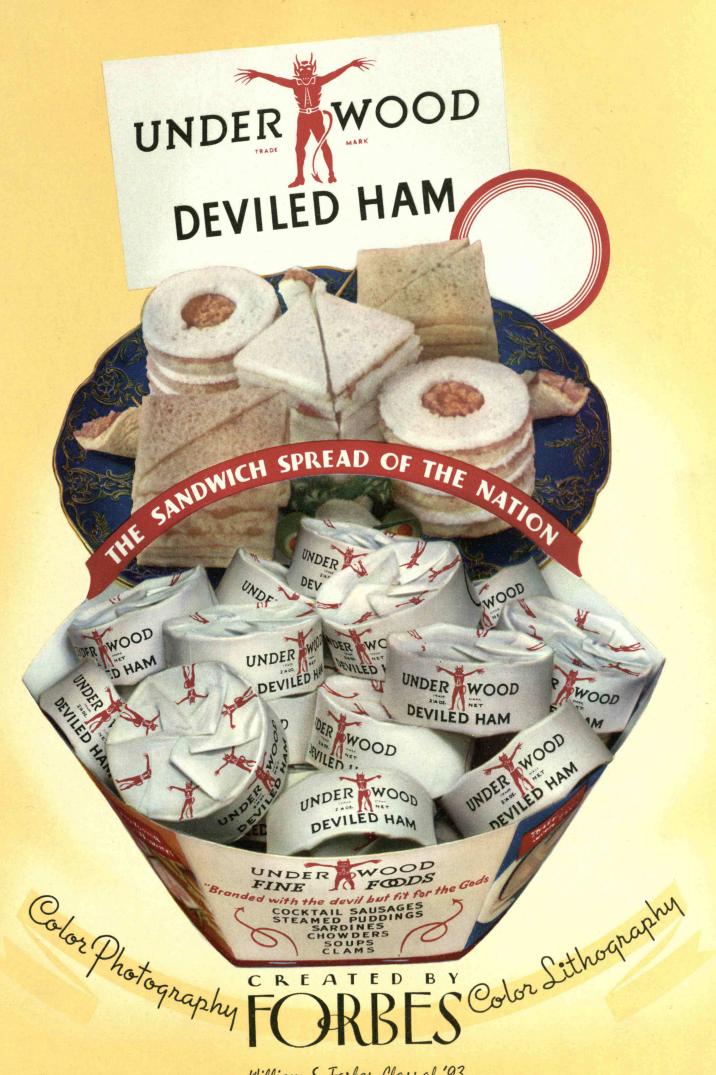
(Continued from page 123)

should normally see, and vice versa, parallax and perspective are set definitely at odds. Parallax now requires that what was previously the background shall become the foreground. Left having been changed for right, front must now change places with back. On the other hand, whatever perspective the picture contains still insists that the previous foreground and background are correctly placed. Whether the fused picture is actually turned wrong side out depends, for almost all observers, on the nature of the subject. If it is a thing about which the observer has no strong preconception, when the prints are transposed the fused picture does in fact reverse foreground and background. The geometrical drawings in The Review's article, "Seeing Solid," 4 are excellent specimens for showing this effect. On the other hand, if the subject is such a thing as a landscape, which contains familiar perspective and a familiar order of occultation, then foreground and background do not so reverse. When the prints are transposed, the mind ignores the evidence of parallax and continues to see what is known from long experience to be the correct view. Most observers report a greater sense of flatness and a greater sense of effort in keeping the pictures fused, but almost no one states that he sees enormous cattle grazing on the far side of a tiny transparent barn, with a barbed-wire fence, made of 10-inch bridge cable, stretched between the herd and the horizon.

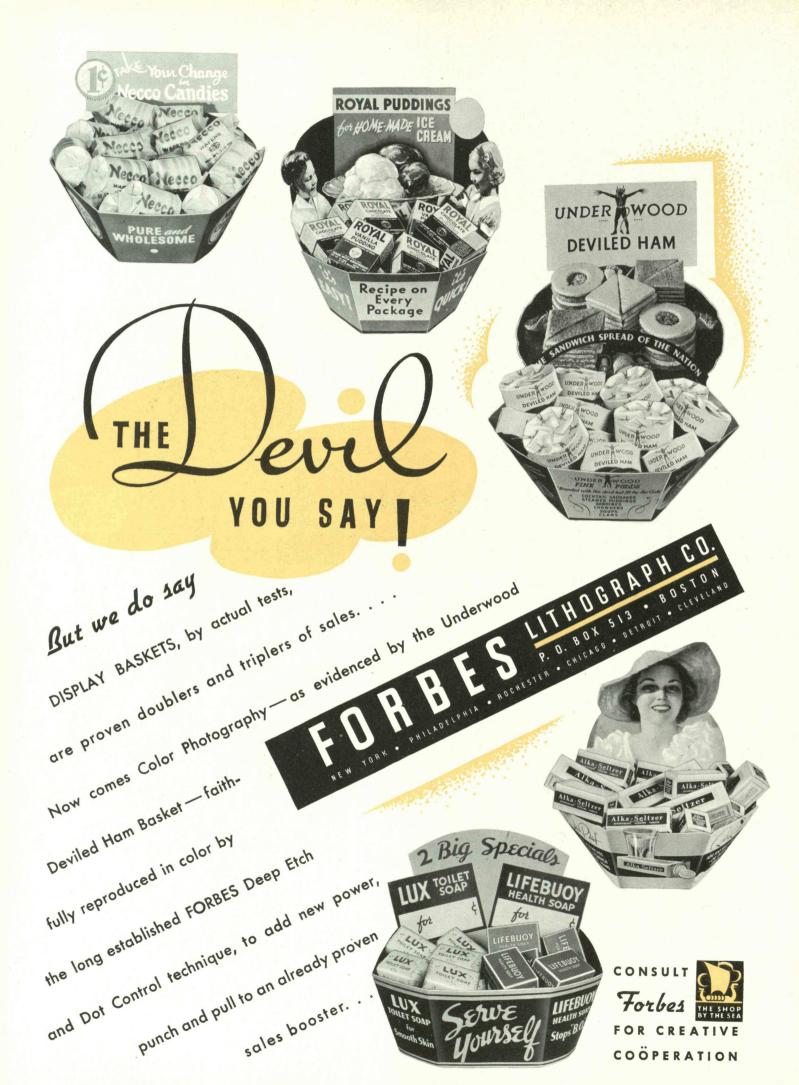
It is interesting to see where this distinction, between pictures which reverse on transposition and pictures which do not reverse, become indefinite. The crystal model stereograms of Fig. 2, made by Sir William Bragg and W. L. Bragg, are useful for this test. In A the balls representing atoms are small and the lines between the balls are prominent. For most observers the parallactic evidence is predominant here: The pictures, transposed, fuse into a truncated pyramid, with large balls at the base, which is toward the background. In B the balls are large and hide one another intricately, and the joining lines are not prominent. When these prints are transposed, the model may look flatter, but it retains its normal order of front and back. In C the system of balls, in the transposed view, becomes a dismaying hodgepodge, but the wooden base has its familiar contour. Here parallax is believed in the upper part of the picture,

perspective in the lower part.

Single photographs sometimes give a strong impression of depth. Ames 5 has discussed various ways of enhancing this impression. All these expedients work by mitigating the evidence that the picture is in a plane, leaving greater sway to the evidence which suggests that the depth is real. The simplest method is to look at the photograph with one eye instead of two. Convergence and binocular parallax (rather, the lack of parallactic disparity) are thus eliminated, and only focus is left in conflict with the perspective evidence. By the use of lenses, the focus can be brought into such disagreement with what is known to be the real distance from the eyes to the picture that its account can be thrown out by the mind. If the picture is viewed in a mirror, again there is uncertainty about its (Continued on page 137)



William S. Forbes, Class of '93



BELIEVING IS SEEING

(Continued from page 136)

real distance, and improved relief perception results. If a pair of identical photographs with marked perspective is viewed in a stereoscope, the impression of relief is quite good. Parallactic dissimilarity is absent here, but the optical system of the stereoscope has so befuddled the focus and convergence that the mind is the more willing to accept the familiar perspective as real.

Painted pictures vary greatly in their ability to give the impression of relief. Edridge-Green 6 remarks that pictures in which the relief is outstanding have been distorted so that the left-hand side shows what the left eye of the observer would see if he looked at the scene directly, while the right-hand side shows what his right eye would see - in other words, the foreshortening is extreme. That this type of distortion is favorable for depth perception follows, he says, from the fact that the left eye generally sees the left half of the visual field, the right eye the right half. This proposition is easily checked. The right hand is held up with fingers outspread, attention is fixed on the middle finger, and the relations of the other fingers to more distant objects in the visual field are noted. If the right eye is then closed, the thumb and forefinger will appear to shift to the right, while the little finger and its neighbor remain fixed against the background. If the left eye, instead of the right, is closed, the thumb and forefinger stay in position while the fingers on the left appear to shift. A similar test, says Edridge-Green, can be made with

stereoprints. The left half of the left print and the right half of the right print are mounted on white paper with the normal separation, and this mutilated pair is viewed in a stereoscope. The impression of relief is strong, though there is here no aid from parallax. Each half is combined not with a slightly dissimilar half but with a white background. These experiments have received little attention. If would be interesting to see whether good relief effect is had when the right half of the left picture and the left half of the right picture are viewed simultaneously, and whether halves of identical pictures, as well as stereoprints, give the impression of depth.

Whether or not each eye dominates its own half of the field of view, and whether or not this domination is of any importance for depth perception in everyday seeing, it is certainly true that one eye or the other dominates the whole field of view. Once more, the stereoscope is convenient apparatus. On one print of a pair, a mark is made which has no counterpart in the other print. In the fused picture this mark will be seen, or will not be seen, depending on whether the eye to which it is presented is the dominant eye for the individual under test. Sometimes the mark snaps in and out of view erratically, indicating that first one eye and then the other becomes dominant. Chauveau has prepared some simple stereodiagrams to show this effect strikingly; some of these are copied in Fig. 3. The diagrams contain little perspective aid to depth perception: Parallax must be the chief basis for any judgment of depth. One picture of each pair is disturbed, either by leaving out lines or by putting in additional lines. (Concluded on page 138)

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WHERE PRINTING IS STILL A CRAFT

BELIEVING IS SEEING

(Concluded from page 137)

It is remarkable how much extra material can be placed in one print without appearing in the fused picture which is seen, and without ruining the effect of relief, which must involve contributions from both the eyes. The mind, apparently, can go blind to the extraneous information, while retaining full sensitivity to those elements which it can fit into a consistent three-dimensional picture. It can believe that a mark snaps in and out of the visual field, but it cannot believe the truth, that the mark is persistently present for one eye and persistently absent for the other. In binocular fusion ⁸ of colors, rivalry of this same sort occurs, and again it appears that a confidence in the unity of the visual field is too deep-rooted for voluntary eradication.

An optical illusion, first noticed by a man who happened to be looking at mackerel clouds through overhead telegraph wires,9 will furnish us with another example. A pattern of broad, hazy stripes, running up and down, from left to right, and along the 45-degree diagonals, is viewed through a rectangular mesh of fine wires (Fig. 4). The stripes that run approximately parallel with the wires of the mesh lose prominence in comparison with those that run diagonally across the wires. That this impression is illusory is shown by rotating the mesh through 45 degrees. The explanation is simple. In looking at an object, the eyes are continually shifting slightly, and the retina receives not a single image but a series of duplicate images slightly displaced among themselves. To each wire in a mesh, for example, corresponds a bundle of parallel retinal images. Experience has shown that the additional images are not significant that there is in the mesh only one wire corresponding to the whole bundle of wire images on the retina. So the bundle is perceived as a single wire; and if there is in the background a real hazy stripe running parallel with the wire, the image of this is liable to be ignored.

Other instances of such adaptation are well known. The retinal images are inverted, and up in the external world is down on the retina; yet this inversion never causes difficulty. Each eye has a completely insensitive blind spot where the optic nerve attaches, a little to the nasal side of the fovea. The simple experiment for discovering these blind spots is familiar to everyone, but there is no flaw in the business of everyday seeing that would hint at their existence. The eye suffers from chromatic aberration (as will be evident to anyone who tries to read, from a distance, red lettering on a blue

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background) ¹⁰ and yet the colored fringes which should accompany the image of a small bright object are not ordinarily observed. The blood vessels which supply the eyes undoubtedly make havoc with the retinal images, yet they make no perceptible havoc with our seeing.

Actually, it is not surprising that we unconsciously ignore all these factors which would confuse us: Each of us has had his own portion of a lifetime for getting used to their presence. The experiments with transposed stereograms, or with nonmatching prints, are in a different class. These are new experiences, to which the eyes and the mind are totally unaccustomed. And one would scarcely expect, a priori, that the mind should show such skill in picking out the pieces of information which it can use in the synthesis of a reasonable and credible picture of the surroundings, discarding the pieces which will not fit. Trump, summarizing his own studies, has stated clearly the conclusion to which all these other observations also point: "... There is nothing which can intelligently be called a 'mechanism' of stereoscopic vision, which is simply another manifestation of that extraordinary cerebral faculty which receives, collects, coördinates, and interprets all the sensory impulses which are continually reaching it, and employs them to build up a single unified conception of the world around us, even to the extent of setting off one sensation against another, in order to arrive at a conclusion which is justified by the sum of the evidence, when the latter is not wholly clear and unequivocal."

Obviously, there is basis here for speculation. That cornerstone of criminal law, the account of an eye witness, begins to look a bit wobbly and insecure. Perhaps the adage should be reversed to read, "Believing is seeing"; and Gelett Burgess ('87) should perhaps be assured that so long as his synapses are fairly agile, he is in little danger of seeing a purple cow.

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 Y. Le Grand, "Convergence of the Eyes and Stereoscopic Effect," Comptes Rendus des Séances de L'Académie des Sciences, 195:176 (1932).

3. R. J. Trump, "Binocular Vision and the Stereoscopic Sense," Transactions of the Optical Society, 25:261 (1923-1924).

4. J. J. Rowlands and J. R. Killian, Jr., '26, "Seeing Solid," The Technology Review, 39:191 (March, 1937).

5. A. Ames, Jr., "The Illusion of Depth from Single Pictures," *Journal* of the Optical Society of America and the *Review of Scientific Instruments*, 10:137 (1925).

6. F. W. Edridge-Green, "The Stereoscopic Appearance of Certain Pictures," *Nature*, 106:375 (1920).

7. A. Chauveau, "Phenomena of Visual Inhibition . . . ," Comptes Rendus, 152:481 (1911); "Conflict of Visual Fields in the Stereoscope," ibid., page 659.

8. S. Hecht, "On the Binocular Fusion of Colors and Its Relation to Theories of Color Vision," *Proceedings* of the National Academy of Sciences, 14:237 (1928); J. F. Allen, "The Binocular Oscillation and Fusion of Colors," *Canadian Journal of Research*, 8:390 (1933); various papers in the "Report of a Joint Discussion on Vision" by the Physical Society and the Optical Society, held at Imperial College of Science (Cambridge, England, 1932).

9. T. Terada, R. Yamamoto, and T. Watanabe, "On Some Optical Illusions," *Scientific Papers*, Institute of Physical and Chemical Research, Tokyo, 26:109 (1935).

10. M. Luckiesh, "On Stereoscopic Colors," *Journal* of the Franklin Institute, 183:773 (1917).

Interesting material will also be found in L. Heine, "Anatomical, Physiological, and Pathological Bases of Stereoscopy," *Naturwissenschaften*, 23:855 (1935).

Fort Wayne, Ind.—<u>Schwegman-Witte</u>
Co., of Fort Wayne, installed the Webster pneumatic-type Moderator System
of Central Heating Control in the Lincoln Bank Tower.

Chicago, Ill.-The Bradner, Smith Co Building, large Chicago paper house, modernized heating facilities with a Webster Moderator System, the W. J. Gemeny Company, of Chicago, acting as modernization heating contractors.

Chicago, Ill.—The heating of the 16-story Marquette Building was brought up-to-date with a Webster Moderator System, William Lees, Inc., of Chicago, acting as modernization heating con-

Montreal, Que.—Webster Heating Modernization of the Royal Trust Building, including orificing of all radiators, fitting all traps with Webster Sylphon Attachments and making changes necessary to accommodate the Webster Hylo System, was carried out by M. Walsh & Co. Ltd., Montreal, plumbing and heating contractors.

Ithaca, N. Y.—In the new office building of the Cooperative Grange League Federation, the Webster Moderator System was installed by the American Warming & Ventilating Co., of Elmira, N. Y.

New York, N. Y .- Jarcho Brothers, Inc of New York, N. Y.—Jarcho Brothers, Inc., of New York, acted as heating contractors in the immense Commercial Building owned by The Port of New York Authority, where a Webster Moderator System gives economical, trouble-free

New York, N. Y.—The well-known firm of Campbell & Smiley, Inc., installed the Webster Moderator System in the 183 Madison Avenue Building.

Indianapolis, Ind.—When the Mer-chants National Bank modernized heat-ing facilities with a Webster Moderator System, W. H. Johnson & Son acted as heating contractors.

Indianapolis, Ind. — <u>Haves Brothers</u>, <u>Inc.</u>, of <u>Indianapolis</u>, acted as <u>modernization heating contractors</u> when heating facilities in the Gibson Building, a five-story garage, were brought up-to-date with a Webster Moderator System.

Pittsburgh, Pa.—McGinness, Smith & McGinness, Pittsburgh modernization heating contractors, installed the Webster Moderator System in the Union Trust Building, here.

Cleveland, O.—The Smith & Oby Co... prominent heating contractors, did all the installation work in the Webster heating Modernization Program carried out in the Hanna Building and Annex in downtown Cleveland.,

New York, N. Y.-Installation of Web ster System Equipment in the Hotel Lowell, 28 E. 63rd Street, was made by John L. Murphy, Inc., New York heating contractors

Baltimore, Md.—Webster Heating Modernization of the Calvert-Equitable Group, Baltimore's "city under a roof," was carried out by Wallace Stebbins & Inc

Philadelphia, Pa.—<u>The Huffman-Wolfe Co., of Philadelphia,</u> installed the Webster Hylo System in the Sylvania Hotel

Chicago, Ill.—Installation of the Web ster Moderator System in the great cen-tral warehouse and office building group of Butler Brothers Store was completed in a remarkably short time by William Lees, Inc., prominent Chicago heating contractors.

Baltimore, Md.—<u>The Baltimore Heat Corporation</u> installed the Webster Moderator System in the Federal Reserve Bank Building, here.

Montreal, Que.—When the Island Land Co., Ltd., authorized a Webster Heating Modernization Program in their 10-story Drummond Building, they selected Thos O'Connell, well-known Montreal plumbing and heating contractor, to make the installation.

Philadelphia, Pa.—The Westinghouse, Electric & Manufacturing Company selected Bowers Brothers Co., Philadelphia heating contractors, to install the Webster Moderator System in their large strilding bore. building here.

Kansas City, Mo.—The Webster Heating Modernization Program in the Railway Exchange Building was carried out by the U.S. Engineering Company.

Cornwells Heights, Pa.—When St. Elizabeth's Convent was modernized with a Webster Moderator System, the P. Gormly Company, of Philadelphia, made the installation.

Newark, N. J.—The Webster Moderator System was installed in the Presbyterian Hospital, here, by I. A. Storms, Inc., well-known Paterson, N. J., heating firm.

Harrison-Rye, N. Y.—Alvord & Swift, New York firm of heating contractors, installed the Webster Moderator System in the Miriam Osborn Memorial Home.

Kansas City, Mo.—In the 23-story Bryant Building, the Webster Moderator System was installed by the John J Sherin Plumbing & Heating Company.

Saratoga Springs, N. Y.-Tarrant acted as modernization heating contractor in 19 Skidmore College Buildings using the Webster Moderator System.

Montreal, Que.—Jas. Ballantyne, of Montreal, acted as modernization heating contractor for the Webster Heating Modernization Program in the 10-story Transportation Building.

Philadelphia, Pa.—A Webster Moderator System heats the 1001-11 Chestnut Street Building, the installation being made by the Keystone Heating & Equipment Co., prominent Philadelphia heating contractors.

Davenport, Ia.—Webster Engineers cooperated closely with the Ryan Plumbing & Heating Company to insure the effectiveness of the Webster Moderator System in the Democrat Building, home of the Democrat Publishing Company.

Omaha, Neb.—The Webster Moderator System installed in the Insurance Building here, coordinates with and complements an air conditioning installation.

The J. J. Hanighen Company, of Omaha, acted as modernization heating con-

New York, N. Y.—John Henderson, Jr., New York plumbing and heating con-tractors, installed the Webster Hylo Sys-tem of Steam Heating in the 817 Fifth venue Apartment Building.

a matter of Cooperation

In nearly every city, leading heating contractors, working in cooperation with Webster Representatives, are developing a volume of worthwhile business in modernization of existing installations by changing them over to Webster Moderator Systems of Steam Heating. The paragraphs reproduced above from recent Webster advertising mention some of them.

SEE WEBSTER EXHIBIT HEATING & VENTILATING **EXPOSITION** New York January 24 to 28, 1938

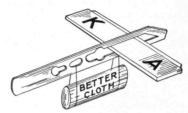
-since 1888 Systems of Steam Heating

WARREN WEBSTER & COMPANY, CAMDEN, NEW JERSEY Pioneers of the Vacuum System of Steam Heating Representatives in 60 U.S. Cities - Established 1888

H. F. Marshall '19—Advertising Manager

Albany, N. Y.—In the new Office Build-ing of the New York State Teachers As-tractor of Selkirk, N. Y., installed the Webster Moderator System of Steam Heating

St. Paul, Minn.—When the heating of eight buildings on the College of St. Thomas campus was modernized, Webster Central Heating Control was installed by J. McClure Kelly, Minneapolis heating contractors. heating contractors.



Trade Mark Registered in U. S. Patent Office

K-A ELECTRICAL WARP STOP FOR LOOMS

A Textile Fact: A Factor in Weaving

1903 34 YEARS OF SERVICE 1937

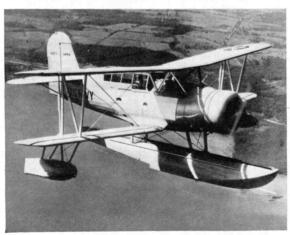
Ten years ago a representative New England worsted mill was 100% mechanical warp stops: today it is **100% K-A.**

The 100% K-A Club is steadily increasing its membership

RHODE ISLAND WARP STOP EQUIPMENT CO.

Pawtucket, Rhode Island

EDWIN C. SMITH '91, President



Curtiss SOC-1 Navy Observation Scouting Biplane of the U.S. Navy

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BOSTON, 25, MASSACHUSETTS

Established 1905

SILK PURSES FROM SAWDUST

(Continued from page 127)

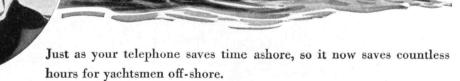
Both plywood and laminated wood have been able to progress only as rapidly as have developments in gluing technique. The most revolutionary advance in this technique has come from the same source as the plastics industry, namely, the so-called artificial resins. As has already been mentioned, phenol and formaldehyde have a strong affinity for wood, but various phenol-aldehyde, urea-aldehyde, and other combinations also have this property. One very distinct advantage of these adhesives is that they can be applied dry. The process consists of placing the constituents - either powdered or in the form of a thin, flexible film — between the members and applying heat just below the scorching point of wood and pressure just below its crushing point, thereby converting the glue into an artificial resin. These thermosetting glues are permanent, waterproof, and decay resistant. Their chief drawback is that heat must be applied, and since wood is a good insulator, the gluing of thick members becomes difficult or impossible. Wet cold-resin glues have recently appeared, but much work still remains to be done. What is needed is an adhesive with all the advantages of the hot resins, but one which can be used cold and without extremely high pressures. Nevertheless, the advent of the resins has greatly extended the use of glued wood, particularly plywood and fine veneers.

Fireproof wood has suffered from many ill-considered attempts to make use of waste materials by impregnating wood with them. Too often the result has been proclaimed to be fireproof when in fact it was nothing of the kind. Another difficulty has been that while some of these materials actually rendered wood temporarily fire-resistive, they lost their efficacy with time. While strictly speaking, there is probably no such thing as absolutely *fireproof* wood, it can be treated so that it will not support its own combustion, will neither flame nor glow after an applied flame is removed, and will merely char while the flame is present. That, after all, is about all that most reputedly fireproof materials will do, since very few will not show surface deterioration or loss of strength under fire.

Two basically different approaches to a solution of this problem are being followed: One consists of impregnating the wood structure with salts of various kinds which in themselves are incombustible, thus rendering the wood fire-resistive. An interesting and fairly recent variant of this method is to use salts which, upon exposure to heat, evolve flame-smothering gases that envelop the treated member and extinguish the flames. The other approach is to cover the surface with an insulating coating which will prevent high temperatures from building up in the wood beneath. Since a thin coating in itself could hardly be expected to keep heat from penetrating and reaching the combustion point, this method calls for the formation of a shield of gas bubbles in the surface film. Upon the approach of flame the coating decomposes, with the evolution of gases which form a complete covering of blisters. In effect, then, an insulating blanket has been formed, which retards the passage of heat to (Continued on page 142)

TELEPHONE CONVENIENCE

puts to sea.



They need not put into port to call home or office, when Western Electric's radio telephone is aboard. In areas served by land stations, on both Atlantic and Pacific coasts, they can be connected with other telephone subscribers just as they can at home.

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PEQUOT MILLS

SALEM, MASS.

HENRY P. BENSON President —Class '86

SILK PURSES FROM SAWDUST

(Continued from page 140)

the wood inside. After the fire is extinguished the blistered coating can be removed and the woodwork refinished. Much research is still necessary to find an entirely satisfactory fire-resistive treatment. Some of the best render the wood difficult to work because they dull tools; others alter the appearance; still others are not permanent. Present research is intensive and holds considerable promise for the future.

Until the advent of timber connectors from Europe most timber structures tended to be clumsy and wasteful of material because of weakness at the joints. Nails and bolts not only crushed the wood badly and had to be numerous in order to attain strength in the joints, but in spite of many years of use their action was until recently imperfectly understood, with the consequence that they were inefficiently employed. The timber connector, as assiduous readers of The Review already know, is a device for transmitting load from one timber member to another, but instead of concentrating at a small area with consequent crushing of the wood, as is the case with bolts, it spreads the load out over a large area, thereby reduces crushing and greatly increases the efficiency of the joint. As a consequence the sizes of timbers can be reduced with a great saving in material and weight. Not only can the joint be made as strong as the timbers themselves, but greater flexibility in design is possible, together with lightness and strength. Graceful wooden radio towers and light but strong trusses are among the developments which have followed the modern connector.

The connector, of course, has brought with it its own peculiar set of problems. For instance, in connector-joined trusses many members, particularly chords, are not solid pieces, as heretofore, but are made up of several smaller timbers spaced apart so that diagonals can be inserted between them. These spaced chords have characteristics under load different from those of solid pieces and, although their action has been studied, complete understanding awaits further investigation. In general, they are more efficient than solid members.

Although much is known and more is being discovered about wood, there are still great stretches of unexplored territory which require extensive investigation before it can be said that our knowledge of wood approaches completion. For instance, while the timbers of Europe and North America are very well known, and there is a very considerable mass of reliable data concerning the Eastern and African timbers, knowledge of the trees and timber of Tropical America is far from perfect. The work of Professor Samuel J. Record of Yale in classifying the trees of Latin America is outstanding, and it has gone a long way toward clearing up the chaotic botanical side of the picture, as well as toward throwing much light on the physical properties of those woods. In general, however, knowledge of the engineering attributes of the Tropical American woods is at best meager and sketchy. Some of the individual species studied show truly remarkable properties: strengths exceeding anything that the Temperate Zone woods can show, extreme resistance to decay and insect attack, and (Concluded on page 144) Brocks Brothers,
CLOTHING,
Men's Furnishings, Hats & Shoes

MADISON AVENUE COR. FORTY-FOURTH STREET
NEW YORK

Looking Back — and Ahead

Lifetime customers are far from unusual at Brooks Brothers. There are hundreds of them, and among them are many whose fathers and grandfathers and great grandfathers, were our customers—and whose children are beginning to be. Tradition and sentiment alone are not powerful enough to inspire this kind of loyalty. Rather, unquestioned good taste, in things that are constantly abreast of the times, uncompromising standards in materials and workmanship, have built for Brooks merchandise a clientele of distinction.

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EXECUTIVE OFFICES AND FACTORIES, PASSAIC, NEW JERSEY

SILK PURSES FROM SAWDUST

(Concluded from page 142)

a range of weights, hardnesses, and figures beyond anything possible with our native woods. It is to be expected that as our finest stands of domestic woods become reduced, the enormous tropical resources will be drawn upon to a greater extent. Before this can happen, however, their technological characteristics will have to be better known.

Surprising as it may seem, even though wood has been used for thousands of years, we still do not know exactly what it is. Chemists have been trying to solve the mystery for a hundred years, but so far have succeeded only in determining that it is made up of certain fairly constant percentages of cellulose, hemicellulose, lignin, and other minor constituents. The composition of the basic cellulose units is known, as well as the fact that these units join into long chains, an estimate placing the number in a chain at approximately five hundred. About all that is known regarding lignin are the percentages of carbon, oxygen, and hydrogen in its composition; about the rest we are still in the dark. As a consequence lignin is one of the greatest waste products of present-day industry, being removed in the manufacture of white paper, rayon, and other cellulose products and dumped into our streams, where it rouses protests because of pollution.

Finally, an acute problem is presented by the fact that trees grow relatively slowly; frequently, the more valuable the tree, the slower its growth. In spite of this fact, our forests are renewable natural resources, as contrasted with many others, and are also natural converters of the sun's energy into usable form. The drawback is that it takes 40 or 50 years to grow a crop, and we in the United States are not willing to wait that long, unlike the countries of Central Europe and the Scandinavian Peninsula, which have learned the necessity of cutting each year only as much wood as has grown in that time. Obviously, if our existing trees could be induced to grow more rapidly, or if new, rapidly growing species could be developed, this problem would be solved. The recently established research foundation at Harvard University, which is beginning a long-range program for the development of better and faster-growing species, is therefore an important contribution toward a solution.

Boit, Dalton & Church INSURANCE

89 BROAD STREET BOSTON, MASS.

85 JOHN STREET NEW YORK, N. Y.

THE MUSIC OF THE FUTURE

(Continued from page 129)

to do with this question, but the reader will be disappointed to find, after a discussion proving that consonances appear at intervals whose ratios can be expressed by small numbers, that "ridiculous though it may seem, this latter (the origin of the pleasure we feel on hearing harmony) remains one of the unsolved problems of music." Again, in his discussion of the effect of the body of a violin on the tone produced (page 105), Sir James seems to contradict a previous statement (page 87) to the effect that the seventh, ninth, eleventh, thirteenth, and all higher odd-numbered harmonics "add dissonance as well as shrillness to the fundamental tone, and so introduce a roughness or harshness into the composite sound." Good violins, he says, reinforce high harmonics — impartially, to be surewhich might seem to indicate that they would produce a shrill tone; bad violins reinforce certain low harmonics unduly, but many of these low harmonics aid in producing a rich, mellow tone. Yet, obviously, good violins are more rich and mellow, as well as more brilliant, than poor ones.

There are also a few other points which might confuse a too trusting reader. The frequency ratio of an equally tempered semitone is first given (page 25) as 1.05946, whereas on pages 175 and 179 we find it changed to 1.0587. Yasser has proved that the 53-note scale was first introduced by Nicholas Mercator in the 17th Century rather than by Gerardus Mercator in the 16th Century, as stated on page 190 of Sir James's book. Finally, perhaps a little too much technical knowledge on the part of the reader is assumed in the discussion of Pythagorean scales and hemitones and the adoption of two of the former into the major and minor modes of today.

These few flaws do not detract, however, from the immense value of the book, and some of the possibilities suggested in the distant future are absorbingly interesting. If the 53-note scale prognosticated by Sir James should become a reality, musicians will have to look to their laurels, since mechanical forces will probably have to be substituted for a human ability too limited to handle such a complex scale. Perhaps it would be well for more present-day musicians to study the science of their art in order to be prepared for the future. Furthermore, it is made quite evident in this book that a mechanical weight dropped on a piano key, or on a succession of keys, can evoke precisely the same sounds, with all their emotional properties, as those produced by human means. A sufficient amount of mechanical ingenuity is all that is necessary. Whether this same possibility exists with regard to stringed and wind instruments is open to question, since performance on them is much less of a mechanical operation than on a piano.

Another interesting fact—one which has already made its appearance in commercial fields—is also enlarged upon in scientific terms. Sir James explains that it is possible to reduce any sound to its elementary component parts, a process somewhat similar to breaking down a molecule. Every sound may be graphed as a curve composed of a number of simple, or pure,

harmonic curves. By photographing the sound curve of any noise, breaking it up into its constituents, and then rebuilding by mechanical means, the same noise may be reproduced. It is startling, even disconcerting, to speculate on the possibilities of talking robots and speaking organs.

Whether such speculation on the future prospects of music prove profitable or not, certainly the illumination shed on the intricate phenomena of the music of today is invaluable. After reading Sir James's book, anyone will agree that the science of music is a baffling, yet vastly engrossing, subject. The field is great, offering plenty of room for all investigators who like difficult problems. The greatest tribute that can be paid to any literary effort is that it stimulates other similar efforts. Sir James's book deserves this tribute, and it is devoutly hoped by this reviewer that it will be paid.

The final division in this discussion is concerned with attempts to evaluate esthetic appreciation. So far as I know, the only truly scientific approach to this subject is to be found in "Aesthetic Measure" by Professor George D. Birkhoff of Harvard. This effort is woefully inadequate. In trying to resolve esthetics into mathematical formulas, he has attempted what appears to be impossible. A brief exposition of his basic formula and the morass into which he plunges the reader when it is applied practically, will suffice. Briefly, this basic formula consists of "three successive phases: (1) a preliminary effort of attention, which is necessary for the act of perception, and which increases in proportion to what we shall call the *complexity* (C) of the object; (2) the feeling of value or aesthetic measure (M) which rewards this effort; and finally (3) a realization that the object is characterized by a certain harmony, symmetry, or order (0), more or less concealed, which seems necessary to the aesthetic effect." It has the following purpose: "Within each class of aesthetic objects, to define the order 0 and the complexity C so that their ratio M = O/Cyields the aesthetic measure of any object of the class."

The impracticability of this formula is apparent in the very first chapter where, after dividing the elements of order, O, into two classes, formal and connotative, we find on page 14 these statements: "Consequently our attention will be directed almost exclusively towards the formal side of art, to which alone the basic formula of aesthetic measure can be quantitatively applied. . . . In following this program, there is of course no intention of denying the transcendent importance of the connotative side in all creative art."

Even this is not the worst of our difficulties. The elements of formal order may, in our esthetic appreciation of such things as painting and sculpture, respond to this treatment, but music seems to be infinitely more intricate. In this latter art the simple, sensuously perceived, formal elements of order, O, are many and diverse, even in a single note. While our ear is not capable of perceiving separately more than about the first six harmonics of any tone, the rest — practically to about the twenty-first, theoretically to infinity—are still of utmost importance, since it is to various combinations of them that we owe the different tone colors of different instruments. To begin with, then, there are (Concluded on page 146)



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SHELTON HOTEL

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THE MUSIC OF THE FUTURE

(Concluded from page 145)

numerous relationships between a pure tone and its related harmonics—all of which compose a single instrumental note. Include the note in a single triad, the triad in a succession of triads, expand these into much more complicated chords, and these in turn into a symphonic composition, and all the paper in the world would not hold the computations necessary to discover the value of M=O/C. This, remember, does not even include the more various and transcendent connotative elements of order.

As an added fly in this ointment let us also consider the fact that no two human beings have exactly the same esthetic reactions to any piece of music. In other words, tastes differ — as variously as the number of people in the world. This eternal and unpredictable variant — individual taste — brings us to a few final questions.

Looking backward over the array of facts at our command, we discover several important things accompanied by questions, the answers to which are unpredictable at present. Science can contribute, and has contributed, valuable things to music. It has given precise explanations of heretofore only vaguely understood phenomena, has produced new instruments and therefore new tones, has added immeasurably to the spread of music, has made possible keener appreciation, and has contributed many mechanical improvements to aid performance. It has widened the field of the composer to an inconceivable degree, given new standards of esthetic appreciation, and has postulated a perfection hitherto undreamed of. It can, in short, eventually produce perfect music - perfect in pitch (any desired scale being used), perfect in volume, perfect in rhythmical unity. It can also reproduce perfectly any music that we have today with all its imperfections — even to the individual vibrato of a violinist or singer.

But when we say perfect, are we speaking in esthetic or in mathematical terms? Here the great question arises: What does human taste, the final arbiter in this matter, demand? Will mathematical perfection satisfy it, or is it not perhaps the very imperfection that science is trying to eliminate which is basic to the satisfaction in people of this elusive quality — esthetic taste? Philosophical observations are somewhat out of place here, but I cannot resist wondering if the seeds of sterility are not sown in the dreams of perfection. As Robert Browning puts it:

"Ah, but a man's reach should exceed his grasp, Or what's a heaven for?"

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Prepared by the Staff of the Color Measurement Laboratory, Massachusetts Institute of Technology, Under the Direction of Arthur C. Hardy.

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Louis F. Buff, 1897

Henry A. Buff, 1905

MAIL RETURNS

(Concluded from page 108)

We then have the following equations:

$$a + A = 10$$
 $b + B = 30$ $c + C = 50$
 $ra + RA = rb + RB = rc + RC = P$

Eliminating a, b, c:

$$10r + (R - r)A = 30r + (R - r)B = 50r + (R - r)C$$

$$A = B + 20r/(R - r) = C + 40r/(R - r).$$

Since A, B, and C are integers, 20r/(R-r)=n, where n is an integer less than, or equal to, 5. Then R=r+20r/n. If we also assume that r and R are integers, 20r/n=m must also be an integer. Then m can be any integer such that r=nm/20 is also an integer. A can have any value between 2n and 10. The other quantities are given by R=r+m; B=A-n; C=A-2n; P=mA+10r. The possibilities are given in the following table, in which x can be any integer:

n	m	r	R	A	a	B	b	C	c	\boldsymbol{P}
1	20x	\boldsymbol{x}	21x	2	8	1	29	0	50	50x
				3	7	2	28	1	49	70x
				4	6	3	27	2	48	90x
				5	5	4	26	3	47	110x
			T.T.	6	4	5	25	4	46	130x
				7	3	6	24	5	45	150x
				8	2	7	23	6	44	170x
				9	1	8	22	7	43	190x
				10	0	9	21	8	42	210x
2	10x	x	11x	4	6	2	28	0	50	50x
				5	5	3	27	1	49	60x
				6	4	4	26	2	48	70x
				7	3	5	25	3	47	80x
				8	2	6	24	4	46	90x
				9	1	7	23	5	45	100x
				10	0	8	22	6	44	110x
3	20x	3x	23x	6	4	3	27	0	50	150x
				7	3	4	26	1	49	170x
				8	2	5	25	2	48	190x
				9	1	6	24	3	47	210x
				10	0	7	23	4	46	230x
4	5x	x	6x	8	2	4	26	0	50	50x
				9	1	5	25	1	49	55x
				10	0	6	24	2	48	60x
5	4x	x	5x	10	0	5	25	0	50	50x

If the restriction to integral rates is removed, as, for example, by making the prices so much per dozen, there are probably even more solutions.

THE TREND OF AFFAIRS

(Continued from page 120)

Poland laid claim to 170,000 unemployed professionals. (This handsome total was obtained quite easily by defining as professional every person who drew a salary.)

Whatever the fate of unemployed technicians abroad, very few engineers in this country were forced to accept direct public assistance, although many of them took advantage of work relief when it became available. In December, 1934, some four per cent of all engineers, or about half of those unemployed, were utilizing this form of governmental aid.

Among the factors with a possible effect on the incidence and severity of unemployment which the Bureau attempted to evaluate were regional location, field of engineering, education, and age. Despite the hours that are spent by many students in worrying about their selection of a course or in bewailing the fate that made this or that part of the country their home, it is interesting to note that, as far as the Bureau could learn, the risk of unemployment was almost independent of the engineer's location and only slightly affected by his field of study. It was a shade more advantageous to be a chemical or ceramic engineer than any other kind, but by 1934 only the civil engineers found the economic cycle discriminating against them.

Education and age, however, had more to say in locating the equilibrium point between supply and demand. Those with masters' and doctors' degrees found their multiplicity of diplomas good protection against the chill winds of depression. Relatively fewer postgraduates lost jobs; those who did found others more quickly than the bachelors. The unhappy bachelors, however, did not find their sheepskins much warmer than mere certificates or even stark nudity in the matter of academic degrees, particularly if they were long out of school.

More potent than the advice of commencement orators or the signatures of secretaries of the faculty in determining who should remain employed were the records of Father Time. Those unemployed engineers who were graduated prior to 1905 were "at leisure" for an average of 23 months, while the graduates of 1925 to 1930 who found themselves in a similar position "rested"

only 12 months. The effect of this longer period of unemployment, of course, was cumulatively to produce a higher percentage of unemployed among the older men.

Whether old or young, however, someone had to be out of work, for during the five-year period ending in December, 1934, private engineering employment in this country declined by eight per cent, while the number of engineers increased by 25%. The Bureau carefully points out that this latter rate was in excess of available opportunities.

Hidden in these averages are some interesting anomalies. Although opportunities for civil engineers in private fields decreased by some 30%, the number of openings for chemical and ceramic engineers increased by a slightly larger amount. There was no great occasion for crowing by the latter, however, for even in 1929 industry employed only about half of all practicing civil engineers, while the number of chemical and ceramic engineers increased during the depression by almost two-thirds.

Luckily, many of the youngsters who had to set sail on an ebbing tide had sufficient flexibility to obtain work in nonengineering fields, a procedure that grew more and more difficult as the displaced engineers grew older. And although the newcomers had a strenuous time getting started, they obtained most of the new private-firm employment that developed in the lean years. The final casting up of accounts showed a net loss of employment by engineers active before 1930 and a considerable absorption of newcomers to the profession.

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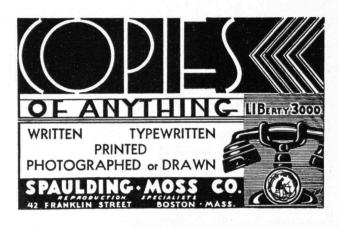
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THE INSTITUTE GAZETTE

(Concluded from page 134)

in domestic architecture of the Architectural League of New York to E. D. Stone, '27. The Boston Society of Civil Engineers gave their Desmond FitzGerald Medal to Albert Haertlein, '18; the Herty Medal of the southern division of the American Chemical Society went to J. L. Howe '96; and an annual medal for notable service was given to J. F. Norris, Professor of Organic Chemistry, by the American Institute of Chemists. In a field less frequented by Technology men, C. T. Leander, '20, won the Sebert E. Davenport Memorial Prize of the Harvard Dental School.

The names of Technology men in public service often made headlines in the newspapers during the past year. The competence of these men in public positions is reassuring: Gerard Swope, '95, "trouble shooter extraordinary to business and government"; T. C. Desmond, '09, for the fourth term, state senator of New York; Charles Edison, '13, Assistant Secretary of the Navy; Roger L. Putnam, '17, mayor of Springfield, Mass.; E. S. Burdell, '20, member of the advisory staff of the Federal Housing Administration; A. E. Cameron, '26, deputy minister of mines for Nova Scotia; and William Hovgaard, Professor Emeritus, member of the Navy advisory board for the building of two new battleships.

The acting director of the New York Museum of Science and Industry is a Technology man - R. P. Shaw, '23; the publisher of Fortune magazine is a Technology man — Eric F. Hodgins, '22; the principal and vice-chancellor of McGill University is a Technology man - L. W. Douglas, '17; a director of the Federal Reserve Bank of New York is a Technology man — W. C. Potter, '97. The American Society of Civil Engineers has A. W. Dean, '92, as its national director, and the director of the American Concrete Institute is M. N. Clair, '23. During 1937 also, J. L. Levis, '26, regained the national foils championship; O. J. Stephens, '30, became codesigner of the America's Cup defender, Ranger, the youngest man to be intrusted with such a commission; and K. S. M. Davidson, '19, received the Captain J. H. Linnard Prize of the Society of Naval Architects and Marine Engineers for towing-tank studies made in designing this Cup boat.

Honored

CEORGE B. WATERHOUSE, Professor of Metallurgical Production in the Institute's Department of Metallurgy, who was recently elected president of the American Society of Metals, has been awarded the honorary degree of doctor of metallurgy by the University of Sheffield. The degree was awarded in absentia at a recent congregation of the college and was forwarded to Dr. Waterhouse, who was unable to be in England to receive the honor bestowed in recognition of distinguished work in iron and steel research.

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TECHNOLOGY MEN IN ACTION

CHECK LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

We've Been Reading

That Severance Burrage'92 of the University of Colorado School of Medicine has made fingerprints on plates of nutrient jelly and studied the colonies of germs that spring up after them. He feels that training in the avoidance of the "finger-mouthing and finger-printing habit" would do much to stop the spread of disease.

That Charles G. Abbot '94, Secretary of the Smithsonian Institution, has been awarded a gold Distinguished Service Medal of the Great Lakes Exposition at Cleveland, Ohio,

for his solar cooker.

¶ That Frank W. Lovejoy '94, President of Eastman Kodak Company, was given a doctor of laws degree by Colby College on the 100th an-niversary of the martyrdom of his ancestor, Elijah Parish Lovejoy, who was killed while defending free speech in the United States.

That GERARD SWOPE '95, President of General Electric Company, is "trouble shooter extraordinary in business and government." "Following the White House conferences between industrial and administration leaders, it was indicated . . . that an attempt would be made to have business in general accept the viewpoint personified by Mr. Swope.'

That LAMMOT DU PONT'01 told a group at an industrial chemistry exhibit, Franklin Institute, in October: "The new must be better than the old to justify itself in competition. . . . Chemical industry is dedicated not only to change but it is also dedicated to the basic policy of consistently and honestly lowering the costs of all goods and services.

■ That RAYMOND J. BARBER '06, was appointed head of the School of Mines, University of Alaska, in July. That ROGER L. PUTNAM'17 was elected mayor of Springfield, in November, backed by the Democrats

and Labor.

■ That Elisabeth Coit '19 exhibited with the Scarpa watercolor group at the Town Hall Club in New York City in December.

That K. S. M. Davidson'19 of Stevens Institute of Technology, received the Captain J. H. Linnard

Prize of the Society of Naval Architects and Marine Engineers, in November, for his paper on "Some Experimental Studies of the Sailing Yacht."

That THOMAS J. KILLIAN '25 of the Barkon Tube Lighting Corporation told the Optical Society of America that carbon dioxide-filled incan-descent lamps have been commercially perfected.

That Hurd C. Willett, Staff, is taking the "almanac" type of forecast out of the realm of long-

range weather prediction.

That WILLIAM HOVGAARD, Professor Emeritus, was praised for his "ever fresh" views at a luncheon tendered him for his 80th birthday by the American Society of Danish Engineers, the Danish Officers' Club, and the Danish Luncheon Club.

Officers

¶ The ability of Technology men to take positions of leadership has been demonstrated often and noted in these columns. We present here some of the recent evidence of their ableness:

I Schuyler Hazard'90, awarded life membership certificate in American Society of Civil Engineers on November 9. This honor was accorded also to HARRY L. Noyes'90.

■ WARREN J. SCOTT 18, made president of the New England Water

Works Association.

Nickerson'23, ■ ELIZABETH C. elected vice-president of the Connecticut section of the American Vocational Association on October

■ C. Sterling Webber '24, chosen secretary of the Connecticut Valley Association branch of the American Chemical Society, November 13.

¶ Ernest F. Langley, Staff, elected president of the M.I.T. branch of the American Association of University Professors, on October 20. PHILIP M. Morse, Staff, was elected secretarytreasurer of this group at the same meeting.

¶ At a November meeting of the Society of Naval Architects and Marine Engineers, the following, among others, were named members of the executive committee for 1938: JOSEPH W. Powell, Corporation

(President of that society), J. How-LAND GARDNER '94, WILLIAM S. NEWELL' 99, DAVID A. ARNOTT '31. HOWARD H. BROWN '06 was elected a vice-president of the society.

DEATHS

- * Mentioned in class notes.
- ¶ George Capen'83, November 14.
 ¶ David A. Lyle'84, October 10.
- ALICE BROWN TYLER'84 (Mrs. Harry W.), November 21.

 LOUIS GODDU'86, September 17.
- HARRY H. HUNT '89, November 30. WILLIAM B. THURBER '89, November 12.
- I DARRAGH DE LANCEY '90, November 15.* (See also 1894 notes and Institute Gazette.)

 ¶ Frederick G. Stritzinger, Jr.,
- '92, January 23, 1937.
- C George Ropes'93, November 16. WILLIAM CREIGHTON PEET '94, November 27.
- John E. Lonngren '95, November 5. (See 1896 notes.)
- ¶ Vernon Peirce'96, August 18.* I FREDERICK C. FIELD '97, September 22.
- GEORGE R. WADSWORTH '98, November 1.*
- [CLEM CARHART '04, November 17.
- HAROLD HASKINS'04, August 19.
- Walter Clarke '05, October 24.

 George Ireland '05, October 31.

 James A. Correll '07, October
- I Ernest Evans '07, November 23. ¶ Philip Schmitt, Jr., '13, October
- Paul Connor'15, October 26.
- BAILEY TOWNSHEND '16, October 18
- Joseph Swenarton '20, August 6. [James Doubleday '23, August 22.
- Edwin Gruessner '23, October 16.
 WILLIAM NEIDERT '25, November
- ¶ Jose C. Medrano, Jr., '32, Octo-
- ¶ James R. Lambirth, former Staff,
- November 22. ¶ Francis P. Garvan, Research Associate, November 7. Mr. Garvan was president of the Chemical Foundation, Inc., and former United States alien property custodian. In 1929 he received the Priestley Medal.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Bridgeport

The Club held its first meeting of the current season at the Stratfield Hotel, Bridgeport, on November 4. As its guests the Club was honored to have President Compton, Marshall Dalton '15, and Ralph Jope '28. These Institute representatives drew the largest gathering of M.I.T. Alumni which has ever been assembled in this vicinity. Members of the New Haven County Technology Club were guests of our Club, and a total of 78 Alumni turned out.

A reception, followed by dinner, was held at 6:30 P.M. at the hotel. James Humphreys'95, Honorary Secretary for M.I.T. in the Bridgeport district and President of the Club for this season, introduced Dr. Compton. The President's

talk was an excellent summary of the aims of the Institute's present building program and its plans for building the man when training future students.

Dr. Compton was followed by Marshall Dalton, who outlined the Alumni's campaign to do their part in the development of the Institute by raising the money necessary for the new gymnasium and recreational facilities. Ralph Jope gave an illustrated talk concerning the details of the new buildings, and closed the meeting with a plea for alumni support of the campaign.

The messages of these three guests were very enthusiastically received and certainly the men in this district will do their part to help this drive. With such an excellent beginning, the present season will undoubtedly be the most active the Club has yet enjoyed, and plans are under way to arrange programs for future meetings which will have considerable appeal to the Alumni. — Ernest J. A. Greenwood, Jr., '34, Secretary, 2048 Elm Street, Stratford, Conn.

M.I.T. Association of Cleveland

The first fall meeting of the Association was held on November 8 at Guildhall Restaurant. There were 46 men present for dinner, after which a business meeting was held. We then saw the new movies of the Freshman Camp and sailing activities on the Charles, both of which we greatly enjoyed. The Edgerton reels were also shown and also a reel of pictures taken with the high-speed camera at General Electric's lamp development laboratory, Nela Park.

The high-speed movies were very interesting to everybody. — Duryba E. Elmendorf'26, Secretary, Lamp Development Laboratory, Nela Park, Cleveland, Ohio.

Dayton Technology Association

The first fall meeting of the Association was held at the Engineers' Club, November 13. Twenty-two Alumni were present for luncheon. The second meeting took place on the evening of December 6, when Alumni gathered for dinner at the Engineers' Club to meet B. Alden Thresher' 20, Director of Admissions at the Institute. Families and friends were invited to be present, and also such principals of secondary schools as were interested in hearing about Technology. — John C. Morse, '14, Scretary, 114 Central Avenue, Dayton, Ohio.

Technology Club of New Hampshire

Thirty-three members and guests of the Club assembled at the Nashua Country Club for the annual meeting. An excellent dinner was served, with the President, Guy A. Swenson '12, acting as toast-master. We were glad to welcome a delegation from Cambridge, consisting of Marshall B. Dalton '15, President of the Alumni Association; Ralph T. Jope '28, Business Manager of The Review; Edwin S. Burdell '20, Dean of Humanities; Nathaniel M. Sage '13, Placement Officer; and Charles E. Locke '96, Alumni Secretary. Speaking in the above order, these men gave the Club an interesting and instructive picture of activities at the Institute and of some new projects which are taking shape. They were given a hearty vote of thanks by the members present.

A short business meeting followed at which the following officers were elected: Walter M. Africa'15, President; Walter D. Davol'06, Vice-President for Manchester; Harold E. Langley'19, Vice-President for Concord; Charles Rich'26, Vice-President for Nashua; and Malcolm C. Mackenzie'14, Secretary-Treasurer, also representative to the Alumni Council. Present at this meeting were Abbott '06, Africa'15, Atherton'24, Bean'94, Brown'99, Burling'30, Conner'88, Davol'06, Dube'21, Emerson'27, Hall'08, Hall'14, Hare'25, Holden'99, Miss Holden'31, Jackson'95, Langley'19, Mackenzie'14, Nakos'25, Mrs. Norton'13, Nutting'19, Rich'26, Rich'30, Swenson'12, Swift'15, Waymouth'16, Whitney'23, and J. H. Bell, Guest. — Malcolm C. Mackenzie'14, Secretary, The Benjamin Chase Company, Derry Village, N.H.

M.I.T. Club of Northern New Jersey

It is gratifying to note here that the first general meeting of the season, held November 16, contained every desirable feature which could be offered for a happy evening by the indulgent club officers. The

170 members who checked through the doors of Duffield Hall in the Newark Athletic Club on that occasion gave evidence of their approval of the officers' offering by consuming table loads of edibles; by imbibing quantities of liquids, ranging from a nameless pink lemonade to cider and reliable coffee; by sincere attention and applause when addressed by Karl T. Compton, President, and Marshall B. Dalton'15, director of the Alumni Drive; by responding in kind with a grand exhibition of good-fellowship acutely enhanced by the ministrations of the maestro, O. B. Denison'11; and by disregarding the clock's final admonition.

New Jersey's earnest Honorary Secretaries were privileged to entertain the guests at dinner preceding the main meeting. The latter was opened on schedule by President Vilett'22, who played the spotlight briefly on the usual summaries concerning specific club activities and workers. Dennie then opened the throttle and set the pace with his pertinent variations of "A Hot Time in the Old Town," followed by Jack Dalton's effective exposition of the Alumni Association's ideas regarding the M.I.T. student recreational facilities, past, present, and future. Dr. Compton, in his turn, held the audience completely. With his customary delightful manner, he imparted much information and observation on a wide range of topics. It may be said truly that northern New Jersey "went" Compton in November.

This was a most agreeable evening. Besides appreciation expressed to the guests, thanks are again extended to Charles E. Locke '96, Alumni Secretary, who has so thoroughly assisted this Club since its founding in 1934-35, and to Cac Clarke's ['21] program and Jack Keck's ['23] membership committees. Using this smoker as a criterion, the next one scheduled for February will advance the worth-while mixing process now showing such good reaction among north-

ern New Jersey brethren.

Monthly luncheons, scheduled from 12 to 2 p.m., continue to draw Technology men and their friends to the Newark Athletic Club on second Thursdays. The Alumni Fund campaign committee under W. I. McNeill'17 reports excellent local progress toward the goal.—A. Raymond Brooks'17, Secretary, Wayside, Brantwood, Summit, N.J. Freeman B. Hudson'34, Assistant Secretary, Colgate-Palmolive-Peet Company, 105 Hudson Street, Jersey City, N.J.

M.I.T. Club of Western Pennsylvania

The first fall meeting of the Club was held on October 15 at the University Club in Pittsburgh. The Dutch supper and the meeting which followed were attended by

41 members. At this get-acquainted meeting, the younger graduates, those of the Classes of '34, '35, '36, and '37, were the guests of the Club. The time-honored custom of singing Tech songs after dinner was revived under the excellent leadership of Dexter'23 with baton and Maestro Dallye'22 at the piano. Everyone in turn said a few words, the old-timers reminiscing on days (and nights) at Tech on Boylston Street. H. W. Dexter, Jr., '23, speaking for our chairman, F. J. Chesterman'05, outlined the Alumni Fund Drive which is now getting under way to provide a student recreational center. Under the able leadership of this committee which also includes E. J. Casselman'15 and M. M. Greer'26, this section should make a fine showing.

The Club had the special honor of Dr. Compton's presence at its November 22 meeting at the University Club. Fortynine members were present. After an introduction by the President of the Club, S. J. Helfman '24, Dr. Compton told us of recent developments at Tech and plans for the greater Technology. Present en-rollment includes students from 223 other colleges and approximately 50 foreign countries, although one third of the total are from Massachusetts. The Riverbank Court Hotel has been purchased and will be the new graduate-student dormitory. Rogers has been sold and a new Architecture Building is now going up at Tech. The high-voltage laboratory has been moved from Colonel Green's estate at Round Hill and will be housed in a new laboratory now being erected in Cambridge. A new wind tunnel is to be constructed and a naval towing tank is planned for the near future. Dr. Compton told of biological engineering, the research funds, and many other new and interesting developments. The showing of slides of the new buildings preceded the general discussion. Friday luncheons are now being held at the Atlantic Grill, 923 Liberty Avenue. — Joseph L. Thistle '32, Secretary, Burrell Technical Supply Company, 1942 Fifth Avenue, Pittsburgh, Pa.

M.I.T. Club of Northern California

On the evening of October 14, the M.I.T. men around the San Francisco Bay were fortunate in having the pleasure of being host at the Engineers' Club to both B. Alden Thresher'20, our new Director of Admissions, and John C. Leslie'28, division engineer of the Pan American Airways, Inc. Professor Thresher's trip to the Coast, the first official visit of a representative of the Institute since Dean Lobdell's ['17] now famous call of the summer of 1936, as Vice-President Bush '16 deprived us of his company in an unofficial visit later in that summer, was eagerly seized upon as the opportunity for our regular fall meeting. The interest in Professor Thresher as a bearer of news from the Institute was exceeded only by the interest in him as a speaker, for he truly portrayed the new admissions policies of the Institute in an engaging and enlightening style.

An informal discussion prompted by the many interesting points brought to light by Professor Thresher led to mention of the plans for the enrichment of student life at the Institute - the new recreational and athletic center. This welcome announcement expressed beautifully the thought and visions of those of us who prowled through the Institute's halls, comforted by facilities less enjoyable than those to which our successors will fall heir. The needs to be filled by the plans as outlined in the literature recently mailed to all Alumni are so broad reaching that everyone should welcome the opportunity afforded to participate directly in this endeavor.

The enjoyable level attained by Professor Thresher was continued admirably by John C. Leslie, who took us with him in spirit on the China Clipper to Hawaii, Midway, Wake, and Guam Islands, and thence to Manila. This survey of the interesting problems encountered and the necessarily unique methods of solution left us all with an appreciative and profound sense of respect for the Pan American engineering staff in their westward

expansion.

On Thursday, December 16, we were honored by Horace S. Ford, Treasurer of the Corporation. At luncheon at the University Club, Mr. Ford mentioned the Institute's projected gymnasium and recreational center, but there was no solicitation of funds at that time. - Scott C. RETHORST'36, Secretary, Columbia Steel Company, Russ Building, San Francisco, Calif.

Texan Report

B. Alden Thresher '20, Director of Admissions, 'came, saw, and conquered.' Thus was his visit characterized by Charles I. Auer'01, who, with Mrs. Auer, took charge during Professor Thresher's stay in El Paso in October. The latter consulted with heads of the educational institutions, as well as with local students who are arranging to enter the Institute in the future. At a dinner given in his honor six of the 15 men present were Alumni: Howard F. Clark'12, Waldron P. Schumacher '04, Paul B. Lord '09, John G. Barry '07, Marden W. Hayward '06, and Charles I. Auer '01.

Washington Society of the M.I.T.

Ninety-three Alumni listened with keen interest Friday evening, November 19, to the oral, pictorial description, vividly presented by Charles Bittinger'01 and J. F. Hellweg, captain at the United States Naval Observatory, of the 1937 eclipse on Canton Island, Pacific Ocean. In addition to acute colored moving pictures of the eclipse itself, the fascinating experiences of the party in transporting their elaborate apparatus and installing it on the selected site were outlined. After an excellent turkey dinner, served at the Cosmos Club where the program was presented, the audience listened with equal interest to Karl T. Compton, President, who gave a most informative talk

on recent progress at the Institute. The urgent need for hearty coöperation of every Alumnus in the drive to provide adequate recreational facilities for undergraduates was emphasized.

On Sunday, November 21, the sad news was received of the death of Alice Brown Tyler'84, beloved wife and lifelong companion of H. W. Tyler'84, President of the Society. — LAWRENCE W. CONANT '21, Secretary, 3008 Ordway Street, Northwest, Washington, D.C.

M.I.T. Women's Association

The Association, as its first meeting of the season, gave a supper and Halloween party for the women students on November 4 in the Emma Rogers Room at the Institute. Mrs. Compton was the guest of honor. Alice G. Bryant '86 gave a sketch of Margaret Cheney's life, her studies, ambitions, and interests, thus making her a more real person to those of us who had never known her. This biographical talk was particularly addressed to our undergraduate guests, whose headquarters are named as a memorial to Miss Cheney.

Thirty-eight students attended the supper and joined in the discussion concerning the proposed formation of an association of the undergraduate women. Since there was so much interest, an organization of this sort is even now in the making. Whether or not it will reassume the name of Cleofan is yet unknown. Games to test our knowledge of Technology and the discussion of dates for future meetings took the rest of the evening. A great deal of credit is due Mrs. Arthur Vignoles'22, Marjorie Pierce'22, and Mrs. Smith of the Margaret Cheney Room for making our first meeting such a success. - Phyllis Needham'36, Secretary, 85 Kemper Street, Wollaston, Mass.

CLASS NOTES

1885

Long-distance telephone service between Boston and Chicago was opened to the public on October 18, 1892. Just previous to the inauguration of this service, the Class had a dinner at Young's Hotel, Boston, at which about 50 members were present. A telephone was at every plate. Other members of '85 held a dinner in Chicago at the same time and were also supplied with telephones. After both dinners were over, Billy Spalding in Boston wielded the bones in his inimitable manner, and later Bob Richardson played his zither in Chicago; each event was enjoyed in both cities. Then followed brief conversations between those in one city and those in the other. All this was made possible by our late classmate, Frank A. Pickernell, who was a telephone engineer, specializing in long-distance service, and who later became assistant to the President of the American Telephone and Telegraph Company. - ARTHUR K. HUNT, Secretary, 145 Longwood Avenue, Brookline, Mass.

Edwin Sibley Webster, by the unanimous approval of all his classmates who have written the Secretary during the last six months, becomes the new President of the Class, and the formality of inducting him into office will take place at our next class meeting. We are extremely fortunate as a Class to have Webster for our leader in the celebration of our approaching 50th anniversary of graduation in June, not only on account of his qualities of leadership but because he knows the history of the Institute intimately through membership in the Corporation and on the Executive Committee of the Corporation during at least three-quarters of the

half century we are celebrating. John Cornelius Runkle has been prevailed upon to accept the vacant office of class representative on the Alumni Council. Again the Class is very fortunate, for John has had the experience necessary to discharge the duties of that office very efficiently. John also has been honored by being appointed chairman of the '88 committee for the Alumni Fund. Serving with him on that committee are Fred Wood, Sanford Thompson, and Fred Ellis. Furthermore, our classmate, John, has kindly consented during the Secretary's stay in Norfolk, to act for him in connection with any matters relating to the Alumni Fund. Men from '88 have never shirked their duty in war or peace. — Besler did not take a course in after-dinner speaking while at Technology, but no one will ever know that he didn't when June arrives. This applies also to Ferguson and many others among our distinguished classmates. — The recent football season reminded your Secretary of the championship we won with seven '88 men on the team in the fall of 1887, defeating Dartmouth, Williams, Amherst, Tufts, Wesleyan, Trinity, and Stevens, and not losing or tying a game. I remember, too, the torchlight parade and bonfire at the close of the season, with six-horse tallyho coaches and Harold Binney doing his Spanish dance. Those were the good old times!

Your Secretary has been asked what he is doing in Norfolk this winter and, by way of reply, will say that he came here with Mrs. Collins because all of his grandchildren, a daughter and her husband, who is a Naval officer on the U.S.S. Arkansas, are here, and we all like it. Recently Mrs. Collins and I were guests at a dinner for ten given by our classmate and his wife, George and Mrs. Roper, at their mansion on Freemason Street. We had an opportunity to see and admire the large number of cabinets and other pieces made by Roper, containing wonderful wood carvings, as well as to visit Mrs. Roper's studio, which occupies the entire upper floor and contains hundreds of wonderful paintings in oil and water color. — Edward A. Cudworth, an architect with us during our freshman year, passed away at Norwich, Conn., on April 16. — Bertrand R. T. Collins, Secretary, 407 Warren Crescent, Norfolk,

1890

Charles Neave, whose death was mentioned in the last Review, came to the Institute after being graduated from Yale in order that he might get a foundation for the practice of patent law. After graduation with us, he worked for a year in what are now the General Electric shops at Lynn and then attended the Harvard Law School. For a time his office was in Boston but in 1897 he moved to New York. A fellow lawyer states that he was considered the outstanding patent law attorney in the country, and was counsel for such companies as the General Electric and others. He had been vice-president of the Bar Association of New York and president of the New York Patent Law Association, as well as member of various executive and other Bar Association committees. In 1933 he became a member of the Technology Corporation, and in his last annual report Dr. Compton states that Neave "aided in the establishment of the Institute's present policy of handling patentable inven-

tions by staff members.

Darragh de Lancey died at Waterbury, Conn., on November 15 after a long ill-ness. He came to Technology from Phillips Andover Academy, and, after graduation in 1890, went to Rochester for the Eastman Kodak Company. Employed as a mechanical engineer, his first job was the designing of machinery for a plant at Harrow, England. This was followed by designing and looking after the construction of the Kodak Park works at Rochester, of which he became manager in 1892. While here he not only designed new machinery but also had general supervision of chemical work. One of his most important contributions was a new method for surface coating a film, which is said to have been one of the devices that made the motion picture possible in its present perfection. A nervous breakdown in 1898 and 1899 necessitated his leaving, and in 1901 he became associated with the Library Bureau in Boston in charge of manufacturing. This he left in 1902 to go to Great Barrington, Mass., as general manager for the Stanley Instrument Company. Later be became connected with the Waterbury Buckle Company and moved to Waterbury, Conn., about 1906. During the War he was chairman of the Second District Board of Connecticut, chief of the industrial furlough section in the adjutant general's office in Washington, director of industrial relations of the United States Shipping Board, and expert with the Central Bureau of Planning and Statistics. After the War, Darragh gave rein to his hobbies and became prominent as a sculptor. For several years he had a studio in New York and exhibited at the National Academy. In 1925 he missed our 35th reunion to receive the degree of bachelor of fine arts at Yale. Among his designs are memorials at Great Barrington and at Newtown, Conn.

Primarily to De Lancey the Institute owes the munificent Eastman contributions. The following is quoted from an

address by Mr. Eastman as published in the Waterbury Republican: "My experience with Tech men began in the year 1890, when we were building the first buildings at Kodak Park and I put on the staff a young graduate mechanical engineer. Those were strenuous days with many difficulties. It was the beginning of the transition from empirical to scientific methods in the photographic business. This young man's veins were full of red blood and, by the way, he had red hair. He made good and soon rose to be manager of the plant, in which position he continued for many years. Since this beginning the Kodak Company has had a constantly increasing number of Tech graduates.

In 1897 De Lancey married Harriet Gallup'94, who, with a son and two daughters, survives him. When, a year ago, knowing he would be confined for months, he wrote "spirits are cheerful, and we have plenty of time to meditate on our mercies and on how many of the good things of life we are still permitted to enjoy," we knew he must be much beloved by many, many people, with whom we give thanks for having known him.

A recent newspaper article records the death of the wife of Edward F. Bragg, our classmate who died many years ago.

— George A. Packard, Secretary, 50 Congress Street, Boston, Mass. Harry M. Goodwin, Assistant Secretary, Room 4-112, M.I.T., Cambridge, Mass.

1894

Since the last class notes were written, the admirable plan for the new gymnasium, auditorium, and recreational center at the Institute has been made public, and work in securing funds is actively under way. The whole plan should make a strong appeal to the Alumni of the early era when there were no facilities worth mentioning for the physical improvement of the student body. It is good to see this side of Institute life receive proper consideration, and there is no danger that the business of professional training will be subordinated to athletic prowess. Every Alumnus will also be glad to see an adequate provision in our own buildings for graduations, convocations, large alumni dinners, meetings, and so on. A most cordial letter from Lewis Greenleaf, accompanying a contribution, well expresses what is probably a general viewpoint. He says: We would have felt like kings if we had had anything approaching the new building. What a dump the old drill shed was, and the sunken lot for baseball and football. Theodore Horton and I have often laughed over our experiences on the tennis court between Rogers and Walker. Good luck to you in your efforts." Incidentally, it may be added that Lewis is active in many good works, including the Albany Medical College and the Albany Community Chest. Al Tenney is also giving splendid assistance in the fund work by contacting all '94 men and women in the Greater Boston area, and he hasn't forgotten to set a good example himself.

A few weeks ago Harriet Gallup de Lancey informed the Secretary of the arrival of her second granddaughter, Margot Singleton Mears, born in Philadelphia on September 21. It would be rather interesting to know how many '94 grandchildren there now are. Some of them must be approaching, or have already arrived at, college age, and the Secretary has been hopefully awaiting the arrival of some of them at his office saying that they were entered at Tech.

John Kittredge has recently changed his address from Philadelphia to 150 East 35th Street, New York City. The notice came to The Review, and John did not give details as to his position, but we shall try to contact him soon. - Jim Kimberly has again taken up residence at Tryon, N.C. It is our impression that Jim has retired from active administrative work in the Kimberly-Clark Corporation at Neenah, Wis., although it is still one of his major interests. mund L. Andrews sent in a new address a few weeks ago: 11,111 South Hoyne Avenue, Chicago, Ill. There ought to be all kinds of good luck in an address number like that. — Charles H. Deitering has also supplied a new address, 4617 Westminster Place, St. Louis, Mo. Deitering is still practicing architecture in that

The friends of our deceased classmate, Joseph Phelan, will be interested to learn that his son, Robert K.'30, VII, has recently left America for a two-year stay in Singapore, Sumatra, and other Far East points in that vicinity. He goes as the scientific investigator for the Chicle Development Company of New York, but will go back to his old employers, the Beech-Nut Packing Company, on his return. — Leonard Tufts, owner of Pinehurst, N.C., dropped a line telling of his approval of the gymnasium project, and states that times are somewhat better for them than earlier in the depressionrecovery era. — S. C. Prescott has been made chairman of the committee on an exhibit showing the operations of Official Food Control at the New York World's

Fair in 1939.

It is with much sorrow and regret that the Secretary must from time to time record the further breaks in the ranks of the Class and in the families of its members. During the past two months news has been received of the death of Thomas S. Marr of Nashville, Tenn., who died on March 2, 1936. No details are given. Marr was with our Class during freshman year. For many years he had been a Christian Science practitioner in Nash-ville. The especially warm sympathy of the Class will be felt for two of our feminine members whose husbands died during the year: Marion Mahoney Griffin, IV, lost Walter B. Griffin; and Harriet Gallup de Lancey, V, lost Darragh de Lancey '90. Mr. and Mrs. Griffin will be remembered as the architects of the new capital city of Australia, Canberra. Recently Mr. Griffin was engaged in designing buildings for an exposition at Lucknow, India, where he died in February or March of last year. He had

previously been the architect of the library for Lucknow University. Undoubtedly his wife had assisted in this work in India, as she had in Australia and elsewhere. Darragh de Lancey was a pioneer with the Eastman Kodak Company, and was not only an able engineer but a great citizen and a charming gentleman. He married Miss Gallup in 1897. A brief appreciation and account of his career appears in the 1890 Class Notes. — Samuel C. Prescott, Secretary, Room 10-405, M.I.T., Cambridge, Mass.

1895

The Alumni Fund Drive is well under way by this time, and reports indicate that '95 will do its part. However, there are some who for obvious reasons are unable to subscribe and whose inability is fully appreciated. If perchance a change of condition should enable them to be included in the list, it will boost the

standing of our Class.

Many members of the Class will remember Ethel Bartholomew, who took the Course in Architecture with us. She was a resident of Minneapolis for many years. For the past eight years she had made her home at Lake Wales, Fla., where she died on September 14. She was an architect in New York, Boston, and Minneapolis, and one-time editor of both Construction Details Magazine and Keith's Magazine. During her residence in Minneapolis, she became prominently identified with the Business and Professional Women's Club and later helped establish the Minneapolis colony at Hesperides, Fla. She is survived by four brothers. — LUTHER K. YODER, Secretary, 69 Pleasant Street, Ayer, Mass. John H. GARDINER, Assistant Secretary, Graybar Electric Company, 420 Lexington Avenue, New York,

1896

These notes are being written practically on the eve of Thanksgiving, and your Secretaries trust that you all have something for which you are thankful. As for themselves, the Secretaries are thankful that they are still living and are also thankful for the support that the Class is giving to the Gymnasium Campaign, thus showing the same spirit as in past campaigns. To us who are in close touch with recreational facilities at M.I.T. and the development of student activity, this seems to be a particularly valuable objective in giving our young men an extracurricular fraining in handling their own affairs and in promoting physical as well as mental development. If one cared to contrast conditions of today with those of our day, he would see a marked change in the student life. For example, the M.I.T. infirmary has made a splendid record in improving the general health of the students, and also the facilities for activities, inadequate though they still are, have made men better prepared for their lifework.

Items of news this month are scarce, and those that are available are sad. Mrs. John E. Lonngren has written the Secretary of the passing of her husband

early on November 5. He had had an operation about a year previous and he felt that he was recovering, but a return of the disease was fatal. John was graduated with '96 but actually affiliated with '95, so that he was known to many members of both Classes. He made a splendid record in the design and erection of steel rolling mills, and in recent years had lived in Los Angeles, where he had undertaken to promote various enterprises.

Vernon M. Peirce passed away on August 18 last, in the hospital in Nashua, N.H., and services were held in the Mount Auburn Chapel in Cambridge, Mass., on August 20. Vernie was born on October 4, 1875, in Boston. He was married, December 1, 1903, in Boston, to Miss Sarah Prutia Smith. A daughter, Prutia, was born on September 8, 1911. For ten years after graduation he was in the employ of the city of Boston, in the engineering division, working up from the position of rodman to that of assistant engineer in the paving division. In 1906 he went to Washington as district engineer of the United States Bureau of Public Roads. This position involved more or less traveling, so that the Secretary had occasional calls from him in Boston. He and his family also occupied the ancestral homestead in New Hampshire during the summer. Many classmates will remember Vernie's home on West Newton Street in Boston, and the cordial hospitality of his mother and sister. This home was kept up until within a few years. In connection with his work, he was the author of various government publications and was a member of the American Association of Street Highway Officials, the American Road Builders Association, the American Society of Civil Engineers, the International Road Congress, and the Cosmos Club in Washington. He was a Mason, a Knight Templar, and a member of the Shrine. — Charles E. Locke, Secretary, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge, Mass.

1898

A local dinner was held on November 23 in the Silver Room, Walker Memorial, at which 15 classmates were present: Elliott Barker, Arthur Blanchard, Ed Chapin, George Cottle, Fred Dawes, Bob Draper, Simon Fleisher, Lester Gardner, Bill Perley, Arthur Porter, Joe Riley, Henry Sullivan, DeK Thompson, George Treat, and George Wright.—Regrets from Walter Cleaveland stated that his class in "making the home attractive" at the Boston Center of Adult Education interfered.

George Cottle showed some reels of pictures taken in England and France last summer, some of which were in color. The pictures were up to George's usual standard, and the talk he uses to accompany them is on a par with that of any professional travel lecture. — Lester Gardner came from New York to report progress on the plans for our 40th reunion. A preliminary canvass shows that 42 men are unconditionally coming and

60 more hope to arrange their affairs so as to come. The character of the reunion was discussed and Lester's plans met unqualified approval. These plans you are probably now acquainted with through Lester's letter.

George Wright is now professor emeritus at the Harvard Medical School. He has for many years been an active full professor, but he asked relief in order to devote more of his time to his private practice. He will, however, continue to give one lecture a week and hold consultations with advanced students.

The following letter, dated October 21, was received from Paul Johnson: "As you no doubt already know, we are back from our European trip, having reached home on September 9. . . . After being home a couple of weeks, I went up to Seattle to meet the yacht returning from a charter cruise to Alaska and, as soon as I could, brought the yacht down to Southern California. While in Seattle I attempted to look up our classmates there and did see Arthur Lawley one noon hour at his place of business, The Washington Iron Works, 1500 Sixth Avenue, South. . . . Howard J. Benson was at Morse Pass, Alaska, and I did not see him. . . . He was expected back from Alaska and is probably now in Seattle. . . No doubt you know that Frank Coombs is back in Los Angeles, though I

have not seen him since he returned. Van Lansingh has been spending a good part of his time of late in the West in connection with the tungsten, molybdenum, and vanadium interests of his company. He is vice-president of the Molybdenum Corporation of America. - Ernest A. Bragg is writing a history of the granite industry in Milford, Mass. This is a hobby. His main activities are in the engineering department of the Draper Corporation, Hopedale, Mass. - Raymond M. Hughes, V, formerly President of Miami University and, more recently, President of Iowa State College, has retired. His son-in-law, Joseph C. Boyce, is assistant professor of physics at the Institute. From Boyce we learn that Hughes is at the Cosmos Club, Washington, and is acting as adviser to a government com-

mission investigating education.
Burton A. Adams, II, is principal of the Technical High School at Springfield, Mass. At a recent meeting of the New England Association of Chemistry Teachers at his school, he gave the address of welcome. — On November 2, the President approved the retirement from active duty of George B. Pillsbury, brigadier general and assistant chief of Army engineers, after more than 41 years' service. The retirement was effective December 31. A native of Lowell, Mass., General Pillsbury commanded the 102d Engineers of the American Expeditionary Force during the World War. He subsequently became assistant chief engineer of American armies in France. Pillsbury started with '98 at Technology and then transferred to West Point. - We received from Lester Gardner an interesting personal circular letter to friends, describing an air trip to Bermuda and back. The

description is very vivid, and we wish we could print it in full. Anyone who reads it will long to make the trip himself. Following an announcement that Hugo Eckener, former skipper of the dirigible Hindenburg, would receive the Daniel Guggenheim Medal for "notable contributions to transoceanic air transport and international coöperation in aeronautics," we note that Lester D. Gardner, Secretary of the Guggenheim Medal Fund, stated that the German zeppelin expert had been selected for the award several months before the Hindenburg was destroyed by fire.

The 24th annual business conference held at Babson Park, Wellesley, early in October was devoted to the theme: prosperity and how to keep it. Many of the most prominent men of our country contributed, and the conference was of even more than usual importance. — We quote from the Boston Herald of November 8 a rather more than usually interesting interview with Roger Babson: "The present stock market decline will be known in history as 'Perkins' Panic,' Roger W. Babson, Wellesley economist, said in an interview yesterday after his return from a trip to France and England. He said the market drop, which he termed 'nothing to worry about,' was caused by heavy buying six months ago in the face of the activities of organized labor encouraged by the attitude of Miss Perkins as secre-

tary of labor.
"Six months ago manufacturers were frightened and bought very heavily,' he said. 'That's when steel went up to those very high figures, something like 100 per cent. Copper and machine tools were very active. People were buying ahead. Then Lewis and Green got into a fight, and the labor attack collapsed. So everybody stopped buying, and these firms even began to have to let people go. The stock market had been going up every day for a year and a half, and of course that couldn't continue. The regulation of margins was all wrong, too, but that's been rectified now. As soon as these surpluses are used up, everything will pick up.' Babson said he saw no signs of immediate war in Europe. He asserted that Italy, Germany and Japan 'really want South America,' and that Germany's talk of reclaiming its colonies is 'only a smoke screen.' England is the bulwark which stands in the way of the three other nations' designs on South America, he said."

Interesting changes of address recently received are: Howell Fisher, Gibson Island, Md.; Ralph Harris, 1180 South Oak Knoll Avenue, Pasadena, Calif.; Charles S. Hurter, East Orleans, Mass.; Joseph J. Moebs, 54 Hunter Avenue,

Newport, R. I.

We are grieved at the sudden death of one of our most prominent and beloved classmates, George Wadsworth. The following from a New York paper was sent by Lester Gardner: "George Reed Wadsworth, who retired in June after nine years as First Assistant State Commissioner of Correction, in charge of prison industries throughout the State, died of a

heart attack yesterday [November 1] at his residence, 29 Washington Square. He was born in Keene, N. H., sixty-two years ago. Following his graduation from the Massachusetts Institute of Technology in 1898, Mr. Wadsworth spent seven years with the New York Central Railroad, engaged principally on the electrification of the Grand Central Terminal. Later he was successively with J. G. White and Co., 1905-07; consulting engineer to the Metropolitan Improvement Commission of Boston, 1907-09; engineering manager and chief engineer of the Peerless Motor Car Company of Cleveland, Ohio, 1910-13; assistant to the president of Gray and Davis, Boston, manufacturers of automobile starting and lighting equipment.

'In the World War, Mr. Wadsworth was commissioned a captain in the aviation service in June, 1917, and was advanced to major the following October. Until December, 1918, he was chief engineer of the naval aircraft factory at the Philadelphia Navy Yard. After the war Mr. Wadsworth was vice president of the United Aircraft Engineering Corporation, New York, 1919-21; a consulting engineer in New York 1921-23, vice president and general manager of the Conlon Corporation, Chicago, makers of electric washing machines, from 1923 until his appointment to the New York State Department of Correction the next year. The near relatives surviving are his widow, who was Alice Randie of Albany at their marriage in 1902; a son, George R. Wadsworth of this city, and a brother, Dr. Samuel Wadsworth of Boston."

Another classmate who was very faithful in attending our meetings and whose presence we shall sorely miss is Charley Smith, who died on October 1. The following is taken from the Boston Evening Transcript: "Charles H. Smith, prominent fire insurance man, died here today in his sixty-second year. He was a native of Charlestown, Mass., a graduate of Massachusetts Institute of Technology and a member of the University Club of Boston. During the World War he served the War Industries Board in fire prevention work. He was a member of the United States Chamber of Commerce and of the American Waterworks Association. He had been president, treasurer and a director of the Blackstone Mutual Fire Insurance Company, as well as director of a number of other fire insurance companies here." — ARTHUR A. BLANCHARD, Secretary, Room 4-160, M.I.T., Cambridge, Mass.

1899

"The Pageant of the Heavens," a book fathered by Frederick W. Grover, has just been published by Longman's Green and Company. Grover's vocation is professor of electrical engineering, Union College, Schenectady, N.Y., and his avocation is studying the stars and other heavenly bodies. I have not read the book yet; that is a pleasure to which I am looking forward. I have, however, read, in the June issue of the Scientific Monthly, his article entitled, "Poetry and Astron-

1899 Continued omy." If you haven't read it, read it. -George Priest has retired from his active work at the Brockton Gas Light Company and is now playing with a large farm known as The Rice Farm, Inc., at Brattleboro, Vt. This farm is operated as a private club, offering all sorts of winter and summer sports. George returns occasionally to Brockton, to see that things run right, but for the most part he stays in Vermont where the prevailing theory of the natives is "there is no hurry about anything." George says there is lots of comfort and pleasure in this theory

From Haven Sawyer I have a delightful summary of his career and that of Ethredge Walker since they left Tech in June, 1899. With the ink hardly dry on his sheepskin, Sawyer went to the Uinta Mountains of Utah, where he was made manager of a smelter within a few months. Two superintendents fell down on the job of running the smelter, so Sawyer sent for Ethredge Walker. Together they put the plant in shape and ran it for two or three years. Eventually the ore body was worked out, and, failing to find any more pay dirt, Sawyer went to California, and Walker went to Ouray, Colo., to the Smugglers Union Mine. Those were the good old days at the turn of the century. The mine manager at Ouray was shot through the window by a member of the Western Federation of Miners - the Moyer, Hayward, and Pettibone crowd. The mines were being managed by Bulkley Wells of Boston. Walker left.

The comings and goings of the two of them covered several western states, as they made trips and examinations down through Tonopah, Goldfield, Rhyolite, Bull Frog (in Nevada), the American Mine in Mexico, then winding up in Idaho about 1907, where, in the Boise Basin, they built a dam and power plant, erected dredges, and worked out Moore's Creek. Eventually Sawyer returned to his old home in Bangor, Maine, where he now lives, but Walker went on to California and is now in charge of some good

dredging operations there.
Clancey Montana Lewis, III, is easing back into his original calling after nearly 40 years of journalistic and organization work. He has served as manager of the Manufacturers' Association of Washington for 23 years but was recently elected a director of the Pine Creek Lead-Zinc Mining Company, which has a developed property and 250-ton concentrating mill in the Coeur d' Alene; he is also associated with the Nicholson Creek Mining Operation in northern British Columbia. He has blossomed out as a bit of an historian, as he is given credit for the text on legislative and industrial law history which appears in the new four-volume publication, "A History of Washing-ton," by the American Historical Society. Sports writers in the Pacific Northwest are playing him up because of his activities in senior golf organizations.

A few more bits of news like this and Frederick Waddell will not be able to say, as he did in a recent letter, that he knew the members of the Classes of '96,

'97, '98, and '00 much better from The Review than he knew his own classmates of '99. He even went further: He said that some Secretaries wrote "delightful, newsy letters." This choice comment followed a remark that he had looked at The Review on the off-chance that there might be something about '99. I do not know whether he was impugning my industry or my versatility, but, in any event, I was glad to know that he read The Review and missed news of his classmates. I shall do my best to write interesting, newsy letters, but I must have something to put in them, unless, of course, classmates don't mind a little fiction. Several years ago I offered to do fiction, but a flock of notes forestalled me. I'd a suspicion you didn't like my offer of romance or, perhaps, you didn't trust it. - Waddell went on to say that a good many changes had overtaken him of late. He joined the honorable order of grandfathers about six months ago and can match stories with the best of us. Then a couple of months ago his son got married. Waddell used to live in Jersey but is now, and has been for two months, living in Bethlehem, Pa. He has spent most of his time since he moved, however, running back to Jersey to visit his children and friends. Waddell's reasons for moving are unique to say the least. He left Massachusetts a good many years ago to avoid spelling such hard words, and now after 38 years he has drifted into Pennsylvania and finds that almost as hard to spell as "that other one."

Miles Sherrill wrote in reply to my recent appeal for news that he couldn't give me any of that but he could send dues, which he did. He still summers at Cape Cod and, if an ocean bath or a good golf course is any inducement to the old gang, either is available, and the latchstring is out. - Samuel B. Robertson, last May, stepped up from the vice-presidency to the presidency of the B. F. Goodrich Company, one of the world's largest tire and rubber manufacturers. Robertson has been with the Goodrich Company since 1919 and has come up from a director of engineering to the highest position the company offers. His headquarters will be Akron, Ohio. - C. B. Cluff of Ivorydale, Ohio, visits Washington fairly frequently and usually calls at my office. Carroll Brown, too, drops in once in awhile. On his latest visit I missed him because I was serving on the jury, and still am at this writing. — W. MALCOLM CORSE, Secretary, 1901 Wyoming Avenue, Northwest, Washington, D.C. Arthur H. Brown, Assistant Secretary, 53 State Street, Boston,

1901

When this January number of The Review is received, there will still remain time to send forward contributions or pledges for contributions to the Alumni Fund at M.I.T., Cambridge, Mass. So, if the national administration or the state of the exchequer or any other reason has previously prevented, do not delay further, but send in your contribution or pledge so that something, even although it has to be limited, may be received from every member of the Class. Please also (those of you who have not) send in your class data sheets, so that the best possible information may be on hand for the preparation of the class membership lists which were referred to in the annual class letter and completion of which has been deferred in order to secure more data

As these notes are being written (November 23) for the January Review, your Secretary is kept away from business by a slight illness, so that further acknowledgements of the class news sent in this fall will be deferred until the February and subsequent editions of The Review.

— ROGER W. WIGHT, Secretary, care of Travelers Fire Insurance Company, 700 Main Street, Hartford, Conn. WILLARD W. Dow, C.P.A., Assistant Secretary, 20 Beacon Street, Boston, Mass.

1904

We continue here with the letter of July 13 from Selskar Gunn to the Secretary, which we started in the November issue and had to curtail because of re-stricted space: "Even if I have not supplied you with any material for your column, I always scan The Review for news. You can imagine my great regret and sorrow in learning of the passing of Volts Ovington, and I recall the early days in 1900 and 1901 when Volts, Paul Paine, Win Vosbury, and myself lived together in Rutland Square. Poor Win, I also have learned, is gone. We had a grand time together, which reflected itself rather seriously in our marks, so that after the first year we split up, although I continued to live with Volts for a year or more. I was a pretty green youngster when I arrived at Tech in the year 1900 from England. What a time Volts and the others had with me, my funny accent and outlandish clothes, including a top hat which I brought with me from England, and, needless to say, never wore while at

"I don't know whether you ever visited us in our rooms at Rutland Square. The front room was supposed to be our study. Volts, who you may recall was very keen on sleight-of-hand and magicians' tricks in general, planted the ace of hearts behind every picture in the room so that he was always prepared to mystify visitors by producing this card in connection with one of his tricks. There were also invisible threads strung up high, which could be used for the levitation of cards from a pack. We also went in for so-called black art. We practically ran a communistic household and all funds were apt to be pooled, so that when anybody was hard up there was usually enough to pay the rent and buy the food for the gang. Once or twice we all were pretty nearly stone broke, and I recall our filing in frequently to Murphy's restaurant on Columbus Avenue, where Fred, the chief hash-slinger at that institution, as soon as he saw us enter, would yell down the dumb-waiter: 'Four on the beans.' He would then draw four cups of coffee, give us three slices of bread and a piece of butter at the colossal

charge of 10 cents apiece. Frankly, I have not been very enthusiastic about the famed Boston beans since those days.

'My allowance used to come quarterly, which was an ill-advised way of supplying funds to a youngster. However, when the check came, the four of us would put on our best clothes and saunter into the grill room of the Touraine Hotel and order up the best. I was supposed to have some knowledge of wines in those days, and I was the expert to interview the wine waiter and make the selection of a good bottle of Burgundy. What a time we had when we decided to go to the circus and sneak our way in under the tent! Volts went to one of the tents where the animals, and so on, were kept, and gave a demonstration of sleight of hand. In a little while he would get a crowd around him, including the men whose business it was to see to it that nobody got into the tent except through the proper channels and with tickets. We all then crawled in under the wooden seats and enjoyed the show. Volts, of course, as the result of his performance, was

passed in by the circus people!
"I wonder if you ever heard of our experience with the hypnotist, Professor X? X insisted that under hypnotic influence he could make us do our mathematics with great facility and accuracy. We had a long session one night in the Professor's room. Besides our gang, Dan Comstock, Eastman, and others were there. The Professor couldn't seem to get any of us under his influence, so Paul Paine pretended that he was hypnotized and worked out a tremendous quantity of mathematical rubbish. We looked on and murmured how wonderful it all was. Paul Paine did such a good job of acting that Comstock thought he was really hypnotized. We had some difficulty keeping the Professor from calling on the Institute authorities the next day to try to get them interested in his unusual method of teaching mathematics.

"I noted with regret in a recent issue of The Review that George C. Thomas'05 had recently died. George was a fine fellow and participated in many of our adventures. It all was strange to me at the time, but I never shall forget the splendid way this group of young men adopted me, a young, lonely, homesick foreigner. I have now been 20 years with the Rockefeller Foundation and am almost one of the oldest inhabitants in that organization, certainly in terms of years of service. My work has always been of tremendous interest, and, I hope, of use and value. You may be interested to know that I have a book for children coming out this autumn. Its title is 'The Doings of Dinkie,' and it is to be published by the D. Appleton-Century Company. I am told that it is also of interest to adults. I can assure you there is nothing scientific about it, but perhaps you will be

interested enough to read it.

"I don't know when I shall get back to the States again, probably not for some time. Mrs. Gunn and I are leaving for Java in a few days and will be back in China again in the autumn." — In view

of conditions in Shanghai, I sincerely hope that Selskar and Mrs. Gunn are still in Java. — Henry W. Stevens, Secretary, 12 Garrison Street, Chestnut Hill, Mass. Amasa M. Holcombe, Assistant Secretary, 4817 Woodway Lane, Northwest, Washington, D.C.

1906

The Engineering News-Record of last May included an account of the spring meeting of the American Society of Civil Engineers in San Antonio, Texas. The following extract from the account will be of interest to our readers: "The new causeway connecting Galveston with the mainland was described before the construction division by Terrell Bartlett, consulting engineer, San Antonio, in a paper in which he reviewed the record of earlier causeways serving Galveston, a record which served as the background for the design of the new structure. The existing causeway has only two traffic lanes for a distance of four miles, resulting in serious congestion. The new structure will have a roadway 40 ft. wide. It will be founded on concrete cylinder piers carried down from 18 to 36 ft. below mean low tide, and these piers are supported on piles driven down into hard clay. The superstructure, except at the openings for navigation, is to be of reinforced concrete, the whole structure being designed to resist tropical hurricanes.'

This from Professor Locke'96: "F. W. Libbey, who is making his home at 2259 Everett Street, N.W., Portland, Ore., has been appointed mining engineer for the War Department, office of the division engineer, North Pacific Division, in Portland." — Under the date of November 11, Cupid Nash was inspired to write to the Secretary. This is his note: "I read in The Review that Helen R. Hosmer is located at Forteau, Labrador. I am sorry I did not know it this summer as I took the Labrador cruise this fall and Sunday, September 5, I was at Forteau Bay and passed the Grenfell Mission while wandering about the 15 or 20 houses and 5,386 dogs and kids, and would have liked to drop in and say hello." Would that more would follow the example of Cupid in furnishing material for this column. As there seems to be nothing else available in the way of news, we bid au revoir until March. — James W. Kidder, Secretary, Room 802, 50 Oliver Street, Boston, Mass. EDWARD B. Rowe, Assistant Secretary, 11 Cushing Road, Wellesley Hills, Mass.

1907

To begin with, here's a letter that's a gem, worth a featured position in a fine magazine. Distinctive in style and in content, this message from Sam Very is a real contribution to our notes: "Dear Saint Nick; or, rather, Dear Old Beelzebub! For your request for a letter violates the gold clause of the bond guaranteeing me a respite from class letters. All right, then, drink this dose, you devil, and may the hemlock work!

"What ferment can there be in your imagination that stirs up interest in me? I am neither as fat nor as important, as

skinny nor as wizened as those fat and important, skinny and wizened plutocratic proletarians of the 30th reunion photograph, though I do admit that the down on my dome gives it a sanctified nimbus. In short, I am getting to look like them, a cadaver of my own past, a philosopher negligent of the cunning artifices that have changed so many of us petits choux into royalties, or the other way about; atoms blown about in this whirlwind of a world, accepting anomalous destiny just as destiny wills. In 1907 I was an architect; in 1917, lo, I have become a warrior; in 1927 I have blossomed into a philosopher; now, in 1937, I am a full-fledged atom, unfettered as the prenatal state, free to be blown about hither and yon, a traveler bouncing about the storm-tossed world, writing letters about the bounces.

"I have lately returned to my own country, for the second time in five years, conscious of two radical changes, the one to myself, the other to my world. I have become a cynic and the world my mirror. I am the only important thing to my mirror, but unfortunately I have grown blind. Besides, the thunders of bolshevik plutocrats have cracked the mirror, and their lightnings have melted its quick-silver. I know now what I suspected in 1927, that even if the mirror is repaired, it won't matter to any of us. Chaos is too interesting; without it, who'd give a hoot about traveling?

"I was in Madeira when Madrid was 'taken' in the newspaper headlines, a delirious day. The governor was 'obliged' four times to appear upon the palace balcony and address the 'frenzied' crowds within the packed courtyard. Many were peasants who had 'marched' all night, singing the Portuguese equivalent of the 'Star Spangled Banner.' That there were in fact no peasants, no national hymns, no crowds, and that the governor's addresses boiled down to but one, and that one to but 20 clackers, made no difference to newspaper headlines. Newspaper 'headlies' are symptomatic of my cracked mirror.

'I was in Tenerife shortly before the kaleidoscopic events in Spain that have fermented those particular headlines. It is a lovely island, so small you can run around its perimeter in a day unless you have engine trouble, in which case you might have to wait a bit for the garage mechanic. In the middle of the island is an active volcano which raises its hoary head two miles above the opalescent tranquillity of the Gulf Stream, but for all that, nobody, so far as I know, suspected, when I was there, that there was boiling around that rumbling base another sort of volcanic eruption that was to convert Eden into Armageddon almost overnight. Since I left there, 200 citizens opposed to Franco were chained together, they say, aboard a ship belonging to one of them, and dumped overboard, literally, in the dead of night. But write to your friends there, if you have friends, and they will tell you nothing of this; they do not dare. I learned the facts from an escaped merchant, an English gentleman

who abandoned everything. He had been looking into my cracked mirror. And the newspaper 'headlies' tell of the normalcy prevailing there, of the rich benefits from the revolutionary utopia, especially in respect of the economy. Take these, Beelzebub, with a grain of Franconian salt; Franco, too, from all I can perceive, is a bit of a cynic. Seven cadavers have been found within the year about the base of Teide, that hoary old volcano of Tenerife, or upon its gentle slopes, murdered, you understand, though by whom nobody knows. They were once breathing animals like you and me, with wills and notions and other nonsensical attributes which caused aberrations in their family politics. Did I mention the unimportant fact that these seven were of one family? No matter; they are dead, and the utopian revolution continues, and the idiotic bolshevists of Madrid resist it, and the 'headlies' of American newspapers tell of the antics; and the plutocratic proletarians get a little blinder day by day as the thunder smashes the mirror more.

"In England, what? I've been in England, lately, three months, around the time the Daily Telegraph printed in wonder a commentary upon the nature of the English by a famous American traveler there, the retiring head, I think he was, of our virtuous American Legion. This made the English out fascist. I forget the alleged proportion of fascist to the rest, but it was considerably over 50%. Since then, you know, there have been several fascist parades whose rank and file there have been variously estimated by the conservative and the reckless, respectively, at from 5,000 to 75,000. Even 75,000, Beelzebub, is not 51% of the English electorate. There may have been something wrong with the observer, or his eyesight, or that cracked mirror; which? The Daily Telegraph wonders. But that same paper wonders about a whole lot of things relative to the English. One is why we of the United States object to our British cousins defaulting on a certain debt they incurred willingly and with full consciousness of the obligation to repay it, when we of the United States, take note, owe the same sum to our English cousins. This, you understand, is not regarded as sophistry; it's the sacrosanct twist blind vision can give to the cracked reflection of a cadaver. England is in her dotage, that's all. She's becoming almost as smug as we are in this country who treat gold clauses as other scraps of paper. She's not fascist; she stones her fascists. She's not a defaulter; she's simply pure in all ways, dilatorily conscious of being victimized, that's all.

'Italy? I lived in Italy one of the five years I have mentioned, part of the time in the north and east, part in the south and west, a short time in Tripoli where so many Italians were to live happily ever after the conquest for a place to live in the sun, and where so few ever overcame the ennui, and went. Ethiopia? Why bring that up? Was not England ready with France to do likewise? And hadn't the Negus himself done so? And, Beelzebub, listen: 'People who live in glass houses shouldn't throw monkey wrenches until the glass is sufficiently annealed.' I know nothing of Ethiopia; I know nothing of Italian fascism; but I do know this there's no hypocrisy in Italy, and there's plenty of it in England, and more here. 'Headlies,' my lad, don't tell all the news. Travel, Beelzebub, and you'll begin to understand me. Leave off that rouge and quit looking into the cracked mirror. Admit you're blind, that you're about to become a blanched, grinning cadaver, that it doesn't matter. Enjoy being an atom. Come to Mexico; that's where I'm bound now.

Sam gives his return address as "care of the Consulate General, United States of America in Mexico, D.F., Mexico, although his permanent mailing address

is Warehouse Point, Conn.

A sad note follows, for in immediate reply to the letter regarding the Alumni Fund sent to James A. Correll early in November came word from Mrs. Correll telling of the death of her husband, and she most thoughtfully sent clippings from the daily Texan of the University of Texas, Austin, Texas, which we reproduce in part: "Main Building flags at half mast all day yesterday marked the end of thirty years of service to The University of Texas by James A. Correll, 54, professor of electrical engineering, who died at his home early Saturday morning (October 30). A heart attack was given as the cause for the death of the man who had climbed to a Texas professorship through every step - tutor, instructor, adjunct professor, and associate professor. . . . Professor Correll was appointed tutor in electrical engineering in 1907 and became a full professor in 1927. He was elected to the Graduate Faculty in 1930-31.

'He was born, May 4, 1883, in Wayne County, Ohio. He lived in Osage County Kansas, from soon after his birth until 1892. He moved to Manhattan, Kansas, and attended the city schools there for seven years and in 1899 went to Kansas State Agricultural College. He married Miss Ella Criss, June 11, 1908, in Anaheim, California. In 1903 Mr. Correll received his degree of bachelor of science in mechanical engineering from Kansas State Agricultural College. He received his bachelor of science degree in electrical engineering from the Massachusetts Institute of Technology in 1907, and his master of science degree in electrical engineering in 1925 from The University

of Texas.
"The professor was president of the Texas section of the Society for Promotion of Engineering Education in 1936. He also was a member of Eta Kappa Nu, honorary electrical engineering fraternity. Other organizations in which he was a member included Phi Kappa Phi, American Institute of Electrical Engineers, and A.F. and A.M. He collaborated with J. M. Bryant in writing 'Alternating-Current Circuits,' published by McGraw-Hill. Professor Correll is survived by his wife and four daughters, Alice Marie, now Mrs. Albert Tisdale of New Orleans, La., Elizabeth Sue, now Mrs. W. W.

James of Odessa, Texas, Eloise, and Margaret Jeanette, students in the Univer-

"Statements from associates of the late James A. Correll follow: Dean W. R. Woolrich: 'Professor Correll was a very fine teacher and administrator. His work will be missed not only in the College of Engineering but in Texas and the whole Southwest.' Dean Emeritus T. U. Taylor: 'James A. Correll came to the University as a tutor in electrical engineering in the fall of 1907. Since that time he has served under seven of the thirteen executive heads of the University. He was always a very loyal and painstaking man. His extreme carefulness in University work and his co-operation enabled him to rise from the lowest teaching rank to the very highest. He was always a splendid faculty worker, a thorough lover of his work, courageous, and made it a point to keep abreast of the trends in engineering education. The merits of his great work, "Alternating-Current Circuits," is attested by the fact that it is being used by several leading engineering schools. His courage and loyalty were admirable. You always knew where he stood on the University's educational problems. He never dodged an issue. His moral strength was outstanding. For thirty years he carried a great burden. It was one of my supreme pleasures to recommend Professor Correll to a full professorship, so that honor came to him several years before his death.'

'Assistant Dean Edward C. H. Bantel: 'There was nothing sensational or spectacular about Professor Correll. He was a modest, unassuming gentleman, doing his duty faithfully and conscientiously and quite content to do it in a way that commanded the respect of his students and the approval of his colleagues. He had a cheerful, happy disposition and communicated his cheerfulness to those who came in contact with him. His friends in the College of Engineering will miss his hearty laugh and friendly, en-

couraging smile.

"Associate Professor Joseph Walter Ramsey: 'No member of the University faculty has served his state more faithfully or more effectively than Professor Correll. He was always at his desk, cheerful, and happy to be of service. His was an unassuming personality with friendliness and good will to all. The affectionate regard with which he is held by his associates and his students of the past thirty years is an impressive tribute to his work.

"Assistant Professor M. B. Reed: 'The students were saying that the place would not be the same with Professor Correll gone. They could do no more than start a flower fund, which was started among the students without a word from a member of the faculty. I feel like the students. The University will not be the same with Professor Correll gone. Words cannot help—they are so futile." — We have written a note of sympathy, on behalf of the Class, to Mrs. Correll, whose address is 402 West 30th Street, Austin, Texas.

A letter from Franklin O. Adams, architect, 305 Morgan Street, Tampa, Fla., reads in part as follows: "I had been looking forward two or three years to the 30th reunion of the Class. After graduating I remained in Boston with an architectural firm until December in 1907. Since that time I have not visited Boston, and, therefore, have never seen the new buildings. But this year, there was an additional attraction at Boston in the convention of the American Institute of Architects. Incidentally, this is the first convention I have missed, either as an officer or delegate, in six years. You may or may not know that the depression in Florida has existed since 1926, the last fatal year of the Florida boom. While the east coast began its recovery three years ago, my territory, on the west coast, did not receive the impulse until the spring of this year. During the first six months of the year I was quite busy with my first real commissions in eleven years. This naturally precluded the possibility of my getting away at the time. I read your class reports with deep interest and take pride in the fact that ours is one of the few Classes which reports regularly. Franklin has a son 21 years old and an 18-year-old daughter.

More of us are becoming grandfathers all the time. Lawrie Allen joined the group on October 23, when his daughter, Helen, became the mother of John Allen Henry. Don Robbins qualified in May, when a daughter, Anne Wheelock Robbins, arrived in the home of Donald G. Robbins, Jr., who, during the present school year, is finishing his graduate work in the Course in Business and Engineering Administration at the Institute. Don himself has a new business connection, having begun work as comptroller of International Braid Company, 47 Charles Street, Providence, R.I., on November 1. He continues to live in Waban, Mass., part of the city of Newton, in a house which he finished building only a few months ago at 24 Pontiac Road.

In a fine letter received in November from Ralph Crosby in Lombard, Ill., he says: "The Review is the very classiest publication one can wish to see and my 20-year-old son, who is a junior in North Central College in Naperville, gets a tremendous kick out of it. Incidentally, he is majoring in zoölogy, and it is my fond-est hope that he shall be able to take a postgraduate course at M.I.T. I have five granddaughters - what do you know about that! I don't feel so old, but still when the family is all at home, totaling 16, it seems like something or other was changing." Ralph has seven children, ranging in age from 27 to 14 years, and six of them are girls.

Since 1932, Otis Fales (remember how he used to play the banjo in the Musical Clubs in undergraduate days?) has been vice-president of Gregg Car Company, Ltd., and from 1907 until 1932 he was with the same company as engineer and salesman. His business address is 19 Rector Street, New York City; his home is at 385 Union Street, Hackensack, N.J. Otis is married but has no children.

Do you recall Edward H. Marsh, XI, lieutenant in freshman drill? Ed left the Institute in 1905 and went to Cornell University where he received his M.D. Degree in 1909. He practiced medicine until 1916, and during that year was with the United States Army at the Mexican border. In 1917 he became sanitary supervisor with the New York State Department of Health, in 1918 consultant in venereal diseases, and in 1923 secretary of the department. In January, 1931, he became deputy commissioner of health for Westchester County, N.Y., the position he now occupies, with office at 18 North Lexington Avenue, White Plains, N.Y. From 1919 to 1921 he studied at New York University and got his degree as doctor of public health, and has lectured in hygiene at that university for the past 20 years. Between 1916 and 1928 he was, successively, instructor, lecturer, assistant professor, and associate professor of preventive medicine and hygiene at Long Island Medical College. Ed is married, has a son 11 years old, and a daughter nearly eight, and lives at 21 Locust Avenue, White Plains, N.Y. Prescott Nichols, VI, was with the

Prescott Nichols, VI, was with the New England Telephone and Telegraph Company from 1907 to 1909, then for a year was with Boston Edison Company, and from 1910 until 1930 was an engineer in the inspection department of the Associated Factory Mutual Fire Insurance Companies in Boston. Since then he has been with Standard Oil Company, Texas Company, Reading Rubber Company, and since 1935 has been electrical engineer with the municipal light department of the town of Reading, Mass. Prescott was married soon after graduation, but has no children; his home address is 1071 Main Street, Reading.

Octavus L. Peabody, familiarly known as Peabo, one of our most interested and loyal Alumni, who during the last few years has taken a respite from definite business connections and has been studying some advanced chemistry and mathematics at the Institute, is now doing sales work with Carrier Air Conditioning Corporation in Boston and vicinity. The Secretary had dinner with Peabo and his wife at their apartment at 32 Clearway Street, Boston, on November 8.

Rodman for the city of New York from 1907 to 1908, draftsman with New York Water Supply Commission until 1911, assistant engineer with New York Conservation Commission until 1920, senior assistant engineer with New York State Engineers until 1922, and then Edward H. Sargent became chief engineer of the Board of Hudson River Regulating District, a position he now holds, with office at 11 North Pearl Street, Albany, N.Y. Ed's older daughter was graduated from Mount Holyoke in 1932, his son is a junior at Cornell, and his younger daughter will be graduated from preparatory school in 1938.

Late in October the Secretary spent a most interesting hour chatting with Theodore L. Smith at his office at Gillette Safety Razor Company, in South Boston, Mass. For 11 years after graduation T. L.

was with the American Locomotive Company, as draftsman, clerk, and chief clerk in Schenectady, N.Y., Paterson, N.J., Richmond, Va., and New York City, and then he became connected with the Gillette people. Until about 1931 he was production manager, and since then has been doing mechanical research work with them, developing the design of razors and blades, studying stresses and strains, heat treatments, and so on. His older son is a graduate of Yale (Sheffield) in 1933 and of Harvard Business School in 1935; his other son will be graduated from the University of California in 1938; and his daughter is at Sweet Briar College in Virginia, specializing in music. The family home is at Concord, Mass.

Last May the following message came from Herbert Spear: "I was delayed in answering your reunion notice until I could definitely decide what to do. It so happens that we are having a pulp group outing at our country club on Saturday, June 5, and as I belong to that division, it is necessary that I be there, so of course cannot participate in the 30th-year reunion. Please convey to all my classmates my best wishes and sincere hope that they will enjoy themselves, especially to my old pal, Peabo, and my keen regrets that I could not make it. Regarding statistics, I am still at the same old job and I am glad to report that business looks a lot better, and we think we can see daylight ahead. In order to keep me out of mischief, I have taken on a side line as secretary and treasurer of the local building and loan association. I am also devoting a little of my time to the city planning board. I had the misfortune to lose Mrs. Spear on August 8, 1936, after a prolonged sickness. As you know, I have no children.

The "same old job" to which Herbert refers is sulphite pulp superintendent of Cascade Mill of the Brown Company at Berlin, N.H. He has been with the same company since 1907, three years as chemical engineer, ten years as department head, and as at present since 1920. — BRYANT NICHOLS, Secretary, 126 Charles Street, Auburndale, Mass. HAROLD S. WONSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

News was received in November of the death, on June 11, of Francisco D. Reyes, chief of the division of tests and standards of the Bureau of Science at Manila, Philippine Islands. Reyes was one of the first government pensionados. He was a member of the National Research Council and of the faculty of the University of Sto. Tomas. Foremost among his articles were "The Industries in the Philippines," "Cogon and Rice Straw as Raw Material for the Manufacture of Paper," "Lime Industry in the Philippines," and "Government Coal Purchase Under Specifications."

We report with regret the death of Alexander H. Bradford, which occurred on September 21. — H. Leston Carter, Secretary, 185 Franklin Street, Boston,

Mass.

1909

Contributions to the Gymnasium Fund are coming in about daily, but we are still a long way from the 100% hoped for. If you haven't already done so, it isn't too late to make your contribution now. Why not at the same time send your Secretary at least a brief statement of what you are doing or news about your family or other classmates with whom you come in contact? - Ray Temple, who for the past year has been with the Ruggles-Klingemann Manufacturing Company of Salem, sends the following information about Clarence Reeds, who has been living in Oklahoma City, Okla.: "Reeds apparently gave up his business as consulting engineer in New York State around 1929 or 1930. Since then he and his family spent three years where he was working in Texas; for some time now they have been living on his father's 160-acre ranch in Oklahoma City, Okla., where Clarence grew up. The father is nearly 80 years old now and is pleased to have Clarence take over the farm and its management looks like he intends to continue indefinitely.

In his letter to Ray, Clarence says: "We have been extremely busy here with all the farming activities which happen to come along about this time of year in the main, getting the ground ready for planting fall crops which mature next year, and then the many jobs of repair which need to be looked after in preparation for winter. It is true that we do not have the long and severe winters of New England, yet they are bad enough to cause one to look for them. Since we moved out here, I have not seen a Tech man whom I have known, and any news from our Class is certainly a delicious morsel. (This country) is very different from New England. In many respects it is very raw but it has wide, open spaces and there is plenty of room to move about. The more pleasant parts of the year here are spring, in May or June, or in September and October in the fall. Our summers are usually pretty hot and dry, and the winters vary from mild days to cold and blustery ones; you cannot tell which day is which, and you have to be prepared for both.

Continuing with Ray's letter: "Their son, Clarence, Jr., is attending high school in Norman, Okla., some 20 miles from home. He will probably go to the University of Oklahoma, as his father did. Junior has a distinctly mechanical turn of mind. Since he remembered little about seeing anything but cattle country, his folks thought it would be a valuable experience for him to visit New England and see some manufacturing. He made a trip over the Mechanical Engineering Department at M.I.T. and the Guggenheim Foundation—all of which interested him very much."—Thurston Merriman's son is attending M.I.T.

On November 12, Arthur B. Morrill, associate civil and sanitary engineer, city of Detroit, Mich., was the speaker at the meeting of the sanitary section, Boston Society of Civil Engineers. His sub-

ject was "Some Features of the New 420 M.G.D. Detroit Sewage Treatment Works."

I have just learned of the sudden death of Fred Faulkner on November 4, 1936, at Halifax, Nova Scotia, where he had been the head of the department of civil engineering of the Nova Scotia Technical College. He was born at Truro, N.S., June 30, 1878, and attended the schools in that town. He was graduated from Acadia University in 1901; taught school for a few years at Granville Ferry and Presque Isle, Maine; after which he became instructor in science at the Perkins Institute for the Blind, then in South Boston, Mass. Entering our Class in the sophomore year, he was graduated from the Department of Civil Engineering, remaining a year after graduation as instructor in Course I. For a short time he was connected with the Bangor and Aroostook Railroad, then served for about four years as resident engineer on the Kettle Valley River Railroad construction branch of the Canadian Pacific Railroad in British Columbia. In the fall of 1915 he went to the Nova Scotia Technical College. "He was an inspiring teacher and was held in the highest respect by his colleagues.

During his stay at Halifax Fred was prominent in the affairs of the professional engineering societies, having been a member of the council of the Engineering Institute of Canada, a leader in the Association of Professional Engineers of Nova Scotia, and its representative on the Dominion Engineering Council. He was president of the Halifax Rotary Club in - Fred is survived by his wife, formerly of Dedham, Mass., and four children: Mary, who took postgraduate work at Simmons College and is now in the library of the University of Pennsylvania; Robert, who attends St. Mary's College; Anita, a student at Mount St. Vincent's College; and James, who is in the public schools. Fred was always a very loyal member of the Class, and will be greatly missed at the various class gatherings. — Charles R. Main, Secretary, 201 Devonshire Street, Boston, Mass. Assistant Secretaries: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

1910

Harold E. Akerly, who is assistant superintendent of the Board of Education at Rochester, N.Y., writes that he has spent his last two summer vacations in New Hampshire but has not taken the time to visit Boston during these periods. Harold has two children, a daughter who is at Wells College and a son. - The following is from the Chicago Daily News of September 30: "C. P. Randolph, chief engineer of Edison General Electric Appliance Company, who for more than two decades has contributed to the development of electric range and water heating industry, has been elected vice-president in charge of engineering, it was announced today. Mr. Randolph obtained his master's degree at the University of Texas and later took a special course in

chemistry at M.I.T. He then entered the service of the General Electric Company and aided in the development of that company's first electric range. He came to Chicago in 1918 as chief engineer for the Edison General Electric Appliance Company when that concern was formed in a consolidation of the heating device department of General Electric, the Hughes Electric Heating Company, and the Hotpoint Company. He has played a leading role in electric range styling and in the development of controlled electric water heating." - Your Secretary is pleased to announce that Charley Greene has become associated with the firm of Cleverdon, Varney and Pike for consultation and engineering service in connection with projects requiring mechanical engineering and electrical engineering, and is assured that Charley will be a great asset to the firm.

The following excerpts are taken from the Washington Post of October 22: "When the Federation of Citizens' Associations needs specialized information on public works, city planning, and kindred subjects it calls on its two delegates from the Washington Chapter of the American Association of Engineers. One of these, for the past nine years, has been Kenneth P. Armstrong, who is the Chapter's new president and who has been active in local civic work ever since he moved to the District twenty-one years ago. As chairman of the Federation's city planning committee, he had a hand in opposing the proposed Jefferson Memorial for the Tidal Basin site and in advocating the plan of the Park and Planning Commission for a stadium at the foot of East Capitol Street on the Anacostia River. Armstrong's regular job is being architectural engineer for the Treasury Department, a position he has filled for seven years. From 1922 until 1930 he was in the real estate and building business in the 'Woodridge' section. He has lived in the same house, at 1512 Kearney Street, northeast, ever since he moved to Washington and has been closely associated with the growth of that part of the city Armstrong joined the Rhode Island Avenue Citizens Association in 1916. In 1929 he became a charter member of the new Burroughs association, of which he was the president in 1931 and where he still has his membership. From 1921 until 1928, he was a director of the Northeast Building Association.'

Your Secretary is chairman of the Alumni Fund Committee for the Class and finds that the returns are coming in much faster as enthusiasm for this new project increases. He wishes, however, that classmates would send in items of interest concerning themselves or other classmates when they return the envelopes which were inclosed with the class appeal. — Herbert S. Cleverdon, Secretary, 46 Cornhill, Boston, Mass.

1911

First of all, please let me express on behalf of my wife and myself grateful thanks to the many classmates who have helped us so by messages and calls in our

long vigil over our oldest boy, Orville, Jr., 19, who miraculously escaped death when thrown from an automobile on the Portland-Brunswick Road the night before Armistice Day. He was returning with a fraternity brother to Bowdoin College, where he is a freshman, after an evening in Portland. At this late November writing, he is still in Maine General Hospital—his mother still with him—much improved physically from his broken collarbone and multiple cuts and bruises. He is improving slowly but, we believe, steadily, from the head concussion. Tough skulls these Denisons have!

With Tommie Haines as impresario Jack and I really decided this was one way we could get him to a class dinner at Walker Memorial - we held a very successful and well-attended 11-11 party this year, postponing it until twice 11, or the 22d of November, instead of having it on the evening of the holiday. Eighteen men were present, and after enjoying a typically fine dinner there in the Silver Room, an interesting "talk-around" was held, following which Dennie outlined the scope and objectives of the Alumni Fund and showed slides contrasting the old and proposed new athletic facilities. Then Jack Herlihy, who has graciously consented to be chairman for the 1911 class drive in Greater Boston, outlined his plans, and the whole group considered the list of 112 Eleveners in the 20-mile Boston radius, each person present agreeing to act as a committee of the whole in seeing a few of those who were absent. In addition to Tommie, Jack, and Dennie, those who attended were E. J. Batty, Obie Clark, Marshall Comstock, George Cumings, A. V. de Forest, S. B. Dyer, Art Leary, Charlie Linehan, Harry Lord, Roger Loud, Charlie McManus, Roy MacPherson, O. W. Stewart, Emmons Whitcomb, and Alec Yereance. Charlie Linehan showed some movies in color of our 25th reunion, and Emmons Whitcomb showed two reels of United Airlines movies, with a most interesting running conversation along with them.

One of the high lights of the talkfest was the observation of O. W. Stewart, who said that his oldest boy, a junior at M.I.T., was finding much more color in his undergraduate life than was his second boy, a sophomore at Amherst. Both are members of Beta Theta Pi Fraternity, O. W. said, and somewhat the same personality types. We also learned with delight that O. W. has recently been elevated to the position of treasurer and manager of the general inspection department of the Associated Factory Mutual Insurance Companies. — Alec Yereance lent color to the evening by producing a still unused 1911 pipe — we got them during our junior year, 1909–1910 — which he came across at home recently.

Roy MacPherson informed us that he and his brother, Jim, Dartmouth '10, in addition to owning and operating the Framingham evening News, have recently bought the Bangor (Maine) Commercial. He also called attention to the fact that Nat Seeley was the featured yachtsman in the November issue of

Yachting. Nat is now vice-commodore of the Cruise Club of America and there is a swell picture of him in salty togs in the magazine. — Harry Lord is enjoying his work with Jones, McDuffee and Stratton in Boston as assistant to the president, who is Gordon Glazier, another classmate. — Batty is spending most of his time now on his work as construction engineer for Lincoln Stores, while Dyer is now assistant engineer of tests for the Boston and Maine Railroad.

On the preceding Monday, at the Technology Club of New York, there was an enthusiastic luncheon meeting of Eleveners, organized and called to order by Jim Campbell, I, 1911 chairman for the Metropolitan area. Your Secretary had planned to attend this en route for Newark, N.J., where that evening (November 15) he led songs and cheers at an enthusiastic smoker of the M.I.T. Club of Northern New Jersey, at which President Compton and Jack Dalton'15, Alumni Association President, were principal speakers. Waiting until the surgeon in Portland assured me that my boy was "out of the woods" held up my departure, and I finally reached New York in midafternoon of the 15th. There Jim met me and told me of the luncheon, where ten of the boys turned out. Besides Campbell, there were Royal Barton, Livingston Ferris, Dick Gould, Harry Lake, Sellie Seligman, Harry Tisdale, Walter Welch, Pete White, and Heinie Zimmerman. I was delighted to see Zim and Ferris at Newark that evening, also Erv Young and, believe it or not, Willson Y. Stamper. He is with Thomas A. Edison, Inc., at Orange and lives in Newark. We had not seen each other since undergraduate days, so we had lots to talk about.

Cac Clarke'21, Vice-President of the Northern New Jersey group, gave me a clipping from the Newark evening News, which read: 'J. A. Proctor (VI) has been appointed assistant manager of the General Electric air-conditioning department in Bloomfield. Proctor has been assistant to C. E. Wilson, the company's vice-president in New York, the last three years. He attended Massachusetts Institute of Technology and is a fellow of the Institute of Radio Engineering. From 1929 to 1932 Proctor was president of the R.C.A. Victor Company and the next two years president of the Fada Radio

and Électric Corporation.'

In Gardner, Mass., November 2, Stan Hartshorn, X, was defeated in the mayoral race. Better luck next time, Stan! Ted Parker, I, T.V.A. chief construction engineer, with headquarters in Knoxville, Tenn., is president of the M.I.T. Club of East Tennessee. - Here's a classmate we haven't heard of for a long time: Irving Pray, V — remember he was a member of our freshman football team and hailed from Natick, Mass. — is now with the bridge department, Louisiana Highway Commission, with headquarters at Baton Rouge. — Ted Van Tassel, Jr., X, writes that he has left Hiram Walker and Sons but is still in Peoria, Ill., devoting all his attention to sales direction for Shoes, Inc. "Gone back from spirits to soles," is

Ted's statement. He wants me to pass along the word to classmates that anyone wanting to make money selling shoes for him anywhere, should address him at 304

Lehmann Building in Peoria.

In Life November 8 appe

In Life, November 8, appeared a fine tribute to the accomplishment of Dick Gould, XI, entitled, "New York Cleans Its Sewage at Hell Gate." This new \$30,000,000 supermodern sewage disposal plant on barren Ward's Island, near the Hell Gate Bridge across the East River from Manhattan, was dedicated on October 23. Treatment used to remove the two per cent solids in the sewage is the activated-sludge process. The sludge is dumped 12 miles out to sea. Plans, however, are now being made for the "digesof the sludge in huge tanks, where it will be transferred into salable fertilizer. There is an air view of the complete works and individual views of the settling and aeration tanks, as well as the sludge dump pumps and boat. We are certainly proud of your remarkable accomplishment, Dick.

This fall there was a reorganization effected at the Edison Company in Boston, and you'll all be glad to hear that Jack Herlihy and Tom Haines now each head important divisions of the corporation, Jack being superintendent of supplies and Tom superintendent of transmission and distribution. In addition to physical supplies, Jack has direction of all motor vehicles, all telephone equipment, and the laboratory division. Tom is in charge of all construction, as well as the operation of the outside electric system and steam distribution. Congratulations to you both! - Eleanor Daniels, daughter of Fred Daniels, VI, and Mrs. Daniels here in Worcester, is again on the dean's list at Smith College. — In the fall issue of Baltimore Transit Topics there are two candid-camera shots of our Ban Hill, I, President of the Baltimore Transit Company, one showing him pinning 50-year medals on one of several employees, the other talking it over with the mother and two youngsters of one of the shop-

When these notes appear, it will be in the midst of the holiday season. So to all of you, here's hoping that you have had a very merry Christmas and will have a happy and prosperous New Year. And remember, during the latter: Write to Dennie! And if you have not already done so, pledge support to the M.I.T. Alumni Fund! — ORVILLE B. DENISON, Secretary, Chamber of Commerce, Worcester, Mass. JOHN A. HERLIHY, Assistant Secretary, 588 Riverside Avenue, Medford, Mass.

1913

Messrs. Thompson, MacKinnon, Townsend, Mattson, and Murdock met with Bill Ready at his home in Brookline early in November to discuss plans for our 25th reunion in June. The meeting was very enthusiastic. The consensus of opinion was definitely that we plan a party which would, above all, bring out the greatest number. Bill Mattson was elected chairman of the reunion committee and Charlie Thompson kindly consented to

assist him. I can assure you that Bill is very clever along the lines of planning such a party as we propose. The general idea is to establish headquarters in either a Boston or Cambridge hotel. The gathering will begin early Saturday morning, June 4, and we shall have a big celebration dinner that night. We plan, the next day, to arrange diversions for men who wish to split up into groups and play golf, go to the ballgame, or whatever else they want to do. We expect that a good number will want to make a real time out of it and will stay over for Alumni Day, June 6. Our Class is asked to have a speaker to the graduating Class in the afternoon, and we shall try to get Larry Hart to do this job for us. The alumni banquet will be held at the Statler and we shall share the place of honor with the 50th year Class.

Our distinguished Assistant Secretary of the Navy, Charles Edison, was recently in Boston on a tour of inspection, to visit the Charlestown Navy Yard. Our equally distinguished industrialist, Bill Brewster, took a tour of inspection to Mexico this fall. I couldn't get much out of Bill as to what he was doing down there; even when I told him that the main purpose of his visit was probably to look over the señoritas, I still couldn't get any statement from him. - Of course, Max Waterman would be too modest to tell me, but Arthur Townsend stated that Max is now in New York at the executive offices of the Singer Manufacturing Company. Max left Bridgeport, Conn., where he was works manager of the Singer plant, to go to New York. — Frederick D. Mur-DOCK, Secretary, Murdock Webbing Company, Box 784, Pawtucket, R.I.

1914

Number 1 item this month is the happy announcement of the arrival on Halloween — and incidentally on his father's own birthday — of Lawrence Sutherland Wilkins. As there are two Wilkins' in the Class, it is necessary to add hastily that the proud — and very proud, too — father is Harold S. Wilkins, XIV. For years the bets were on Wilky as the class bachelor and now "at long last" we find him the class authority on perambulators. Boston'14 men are considering holding a special dinner in honor of Wilky.

Mert Richardson, Jr., and Herman Affel, Jr., have been rowing stroke and number 7, respectively, on the M.I.T. freshman crew. — Dean Fales again told his story on the new automobile models before the New England section of the Society of Automotive Engineers on November 9. This annual report by Dean has become one of the high lights of the season. — Herman Affel has had still another patent issued to him. This time it is for a means of monitoring programs over telephone circuits. A circuit patent has also been issued to Phil Currier, who is with the General Electric Company at Schenectady.

The Student Welfare Fund Campaign continues, and although we are still far from our goal, it is pleasant to know that

1914 is, at this writing, well up in the list of Classes. — H. B. RICHMOND, Secretary, General Radio Company, 30 State Street, Cambridge, Mass. Charles P. Fiske, Assistant Secretary, 1775 Broadway, New York, N.Y.

1916

The Boston Globe of October 19 carried the following announcement concerning the marriage of Phillips N. Brooks: "Mrs. Rowland Ward of Hammond Street, Waltham, announces the marriage of her daughter, Miss Amy Isabel Ward, to Mr. Phillips Nelson Brooks, on Saturday, Oct. 16, at Augusta, Me. The bride was graduated from the Framingham Hospital School. Mr. Brooks, son of Mr. and Mrs. Frederick K. Brooks of Haverhill, was graduated from the Massachusetts Institute of Technology."

Your Secretary received a communication from Dina Coleman, of Gay-Coleman Construction Company, Lexington, Ky., in October. Here it is: 'Please send me a list of the Sixteeners whom I might look up in New Orleans and along the Texas Coast. We are leaving here Saturday of this week in the boat and expect to stay on the South Texas Coast during the whole winter. Please address your letter to me in care of the yacht Ensign, Cairo, Ill., as we shall have left here before your letter could get back." I hope that Dina will see this note in The Review because the information requested was forwarded the day his request was received, addressed exactly as directed. The letter came back to the sender. Let's have a better mailing address next time.

Your Secretary made a rather extended visit to the West and Southwest during October and part of November, making some very pleasant class contacts en route. In Denver I telephoned Murray G. Graff, VI, at his office and found that he had gone to New York on business. However, his secretary felt sure that she would be able to persuade Mr. Graff to write your Secretary a newsy letter. The

letter has not yet arrived.

On Saturday, October 16, I had the pleasure of lunching with George W. Repetti, III. George, you know, went to Colorado Springs in 1929 to become associated with the Holly Sugar Corporation. Colorado Springs is the executive headquarters for this company, which operates beet-sugar refineries in a number of the mountain and western states. George is now executive vice-president, and if you could see his office, you would certainly understand the importance of the position he occupies. He has three children. His 15-year-old boy is at Canterbury School in Connecticut, and his 13-year-old girl is at the Convent of the Sacred Heart at Noroton, Conn. Another ten-year-old girl is in boarding school. Colorado Springs is about 7,000 feet above sea level, a city with unusually beautiful scenic surroundings. George owns a house in one of the most attractive locations of the city, just a couple of houses away from the Broadmoor Hotel and close by the Country Club, where your Secretary was entertained at a most delightful dinner. If the foregoing does not make all the rest of you classmates eager to stop off and visit George, then your Secretary has not described his cordial reception adequately.

In Houston, Texas, on Friday, October 22, your Secretary telephoned Kem Dean and Ralph Bennett. A luncheon was arranged at the Houston Club, Ralph Bennett being host. The meal was delicious, the company perfect. Those of you who have not seen Ralph Bennett would certainly get a real kick out of a visit with him now. Outside of being a little heavier, he has not changed a bit in appearance, and his spirit is unchanged. He is now vice-president of the Mills Bennett Production Company, which is an oil-producing concern. Ralph acts more or less as the general manager and is very much interested in the drilling operations. Ralph's daughter is 18 years old, a junior in the architectural department at Rice Institute. I believe she may be heading for further studies in architecture at M.I.T. Kem Dean, who was at our reunion a year ago last June, is in the cotton brokerage business. He has built himself a lovely home in Houston. He has two daughters, 13 and eight years old. Both Kem and Ralph were enthusiastic about the possibilities of a grand reunion for our 25th, and both promised to be on hand. Incidentally, Ralph was leaving for Lubbock, Texas, the following week, where he promised to look up Jim Murdough, I, who, we understand, is head of the department of civil engineering at the Texas Technological College at Lubbock.

On this trip your Secretary had hoped to call on Art Shuey at Shreveport, La., but got no further than Baton Rouge. Perhaps we may have some news of Art in the near future. — James A. Burbank, Secretary, The Travelers Insurance Company Hartford, Conn. Steven R. Berke, Associate Secretary, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

1917

Phil Hulburd had planned to prepare this whole section for the present month, but it becomes the sad duty of his Cosecretary to include word of the air tragedy resulting in the death of Henry Clayton, who was killed while piloting a United States Naval Reserve airplane on a return flight from Indianapolis, Ind., to Floyd Bennett Airport, Brooklyn, N.Y. The crash, which occurred at Friendsville, Md., on September 5, was apparently caused by heavy fog, which he attempted to avoid by flying south, with the result that his gasoline supply became exhausted before a safe landing could be made. A wing of the plane fouled a tree during the attempted landing between fragments of cloud touching the ground, and the plane was completely demolished and burned. Commander Clayton enlisted in the air service of the Navy at the beginning of the War and served overseas in Italy and France. Since the War he maintained an active association with the service and

for a number of years was the commanding officer of one of the reserve units in the Third Naval District, attaining the rank of lieutenant commander.

The accident occurred on the eve of the award to Clayton's squadron - which he had commanded for several years of one of the highest annual efficiency ratings attained by a Naval Reserve squadron in the Eastern United States. Aviation was his active avocation since the War, and he held a transport license for a number of years, being credited with over a thousand hours piloting without accident. Burial was at Canton, Mass., from the home of his father, Henry Helm Clayton, who is well known for his studies of long-range meteorological forecasting. A firing squad from the Boston Navy Yard escorted the body, while fellow officers of Scouting Squadron 3 from Floyd Bennett Field acted as

At the time of his death, Clayton was employed at the general offices of the American Telephone and Telegraph Company in New York, engaged in the preparation of "Bell System Practices." His home was at Roslyn, L.I. He is survived by his widow, Augusta F., and his son, George C. Clayton. Commander Clayton's brother, L. L. Clayton'17, is a major in the Signal Corps stationed at Fort Monmouth, N.J., and is now preparing for a transfer to a new post at Fort Worden, Wash.

With these notes your Assistant Secretary makes his initial and official bow. It would perhaps not be out of place to say here that the circumstances of his election at Marblehead were such that he feels some doubt both as to its legality and its wisdom; and so bows in a hesitating way, with a proper gesture in the direction of the editorial offices of the Red Book magazine — or perhaps the gesture should be aimed toward Philadelphia. At the moment, the ''intellectual calm'' which Ray Stevens imagines exists at Exeter is not sufficient to warrant an accurate solution to the above problem of direction

Edward P. Warner has been appointed James Jackson Cabot lecturer on air transportation at Norwich University for the current year. It is reported that he will also prepare in this subject a new course for inclusion in the University's curriculum for next year. Edgar S. Gorrell is a trustee of the Cabot Foundation under which the new course is to be established. — In October Lewis W. Douglas was appointed principal and vice-chancellor of McGill University at Montreal. In announcing his appointment, Sir Edward Beatty, chancellor of the university, said: "Dr. Douglas comes to the university with a background of achievement, intellectual and practical, which ensures his success. Added to his great ability, he possesses a personality and character which assure the university of competent and wholesome administration. I am sure his colleagues on the faculties will find in him a wise and generous counsellor and friend. McGill is fortunate, and Dr. Douglas is sure of a

warm welcome when he assumes office on January first next." Many members of the Class will remember that Douglas came to the Institute in 1916, after his graduation from Amherst. He subsequently served with distinction in the American Expeditionary Force, following which he taught at Amherst and at the Hackley School. He then returned to the family business in Arizona before his first election to Congress in 1926. His record in Washington is too well known to need recounting here, but the facts that Douglas received, in 1933, honorary LL.D.'s from Amherst College and Harvard University and in 1935 delivered the Godkin lectures at Harvard may have escaped the notice of some members of the Class. The lectures have been published in book form under the title, "The Liberal Tradition: A Free People and a

Free Economy. Henry E. Strout is reported from Portland, Ore., as serving capably as an executive of the California Packing Company. His responsibilities were apparently such as to keep him from attending the reunion. — Ray F. Goudey, sanitary engineer, Los Angeles Department of Water and Power, was one of the speakers at the June convention of the American Water Works Association in Buffalo, N.Y. - From the Boston Evening Transcript for September 29: "Victor Alfonzo Checa, of Lima, Peru, left on Monday for New York, after being the guest of Mr. and Mrs. Lloyd B. Salt at their Chestnut Hill house for a few days. Mr. Checa, who was a classmate of Mr. Salt's at the Massachusetts Institute of Technology, which they attended with the class of 1917, was making his first visit to Boston since he left college twenty years ago. He was en route to South America from Europe where he has been traveling all summer, and is returning to his plantation near Lima via Bermuda

Frank S. Krug, Jr., writing from Cincinnati as general manager of the Cincinnati Ice Manufacturing and Cold Storage Company, reports himself much involved with his business and sorry that he was unable to get to Boston for the reunion on that account. He has been third in command of the community chest drive for the past two years and for the last ten years has served as director and consulting engineer for the Cincinnati Automobile Club. - Edward D. Sewall writes from Oneida, N.Y., as follows: "Going way back into ancient history in 1930 while I was with Mac-Donald Brothers, Inc., I was doing some industrial engineering or efficiency work for them here at the home of Community Plate. I liked it so much here that I decided to stay, and in June, 1931, severed my connections with MacDonald Brothers and joined forces here, where I stayed until September, 1933. At that time Mr. P. B. Noyes, the President of Oneida, Ltd., and also the President of the Saratoga Springs Commission, had negotiated a government loan of \$3,200,000 for the construction of a new spa at Saratoga. He wanted me to go up there for a couple of

years as a construction engineer representing the State. Those two years were mighty interesting, where you start out in the middle of a field, dig some holes, fill them with foundations, and eventually see ten beautiful Georgian brick buildings and a blue tiled outdoor swimming pool, as well as \$250,000 worth of landscaping. I came back from Saratoga, the first of 1936, and am carrying on here doing industrial engineering. Last year we shipped out 350,000 gross of eating tools and when that is multiplied by 144, that is a . . . lot of silverware for one year. While at Saratoga I was badly bitten by the ski bug and was officially initiated by four other ski nuts who took me to the top of Gore Mountain, via bus, strapped on my skis, and said: 'Follow me.' I said, 'Where! Down this trail?' Sacré bleu! Here I was at the top of a mountain, down which ran five different trails, the shortest of which was four miles long, and I swear they were not over four feet wide. I could see this narrow slice through the forest for about 25 yards and then it turned 90 degrees to the right and disappeared entirely. The other nuts disappeared with it and hollered to me to come along. I had either to ski or walk down; I compromised and slid, slipped, fell, and everything else,

eventually getting down to the bottom."

Nig adds as a kind of postscript: "As you probably know, I am married and have a boy who, although only 11, will be beating me at golf in a couple of years." Nig has sent also some late adventures of Jean Batisse Belair which I very much regret cannot appear here, on account of space restrictions rather than "hon account de hawful steenk," as the last line has it. Your Assistant Secretary would be glad to supply copies, however, as a prize, in exchange for a letter of request, from which he will hope to gather news for inclusion in future issues of The Review. — RAYMOND STEVENS, Secretary, 30 Charles River Road, Cambridge, Mass. Philip E. Hulburd, Assistant Secretary, Phillips Exeter Academy, Exeter, N.H.

1918

After a long, hard day in the classroom, our favorite relaxation is to come to anchor beside the Massachuseits Avenue fence and consider the destruction and construction that is going on for the Architecture Building. Astray in such pleasant contemplation last week, our reverie was disturbed by Win Caird, who turns out to be the resident engineer on the job. For a former publicity manager of the Tech Show he is remarkably reticent. All the cleverest questions we could think up before the five o'clock whistle extracted only these items — by a process best described as a leakage: Win has been with Stone and Webster for 14 years and has one daughter, aged 10 years.

Al Murray, matchless gentleman that he is, wrote a little note to accompany his generous check for the gymnasium fund. (How about your contribution?) For the past four years Al has been in

charge of the television development work for Philco at Philadelphia. But, for all that, he cannot see what's going on in Washington any more clearly than the rest of us muddlers. - The conquering legion of the years is indeed upon us. Former students of mine are now writing comments to me on what kind of executives you birds turn out to be, as seen by the worms serving under you. A 1937 graduate, now trying beginner's luck with the Hoover Company, writes: "Mr. Cummings (Stan to you) is a grand man to work for, and he certainly is modest for a person in his position of authority. Atta boy, Stan! The old motto is "it with a minimum of self-assertion."

On the day following the publication of the November Review and its sleazy report of a hearsay story in re one rash child of a house born into an unappreciative environment - perchance architectured by our own Bill Wills - Chink Watt and, later, Tom Kelly were in the office. We shared in high glee the following two letters. The first was resplendent on rag paper and reads as follows: "Re: This month's Review. I was very much interested in Professor Dewey's review of the book on President Maclaurin. There is one quotation that struck me particu-'He gave every man his ear, but few his voice.' I also read the class notes. Yours truly, Bill Wills.' — The other, less restrained document came on a discarded scrap of yellow paper. It left us with the awful feeling that its perpetrator needs to be psychoanalyzed or else to hire a stenographer. Here it is exactly as received: "Being an over-the-shoulder reader of the TcNology Review class notes, I am moved to reply, the which I haven't been so moved in Lo these many years. I don't see how you get a bellylaugh over the poor guy who wanted to build himself a biscuit-factory house on a lot surrounded by dwellings which simply oozed cult-yoor, Refanement and the Higher Things of Life. That's always the way when a guy wants to 'go modern' here in New England. Noses are looked down, eyebrows are raised, lips are curled and buck teeth exposed by his, shall we say, betters. Anyway, I'm glad that you knew why the fishermen's wifes went to the roof. Me - I cawnt imagine!! . simply must get around to more of the Emma Tee funxions and do the I-remember-the-face-but-not-the-name act.

'Glad to hear from you personally about the funds for a bucket of mortar for the Richer Student Life plan. As soon as some of my clients pay me I'll shoot some to you. And I don't mean mortar. Don't have the 1938 re-onion too far away. I mean as regards of distance. M' bunions holler too loud. Yeah - I got reg'lar station-ery that I use for come-on letters and such, but this here epistle is just filling in between 5:30 and 6, so it don't rate my super-vellum. Don Goss.'

Through the coöperation of the Secretary of the Class of 1911, we submit a concise report on our innkeeper, Ralph Mahony. He has just had his appendix out at the Clinton Hospital and is back

at Sterling Inn recuperating. - These notes are being written during time made available by skipping a meal in anticipation of turkey, costly groceries, and pumpkin pie. At Thanksgiving time, but looking ahead, we want to wish all you boys a Happy New Year. - F. ALEXANDER MAGOUN, Secretary, Room 5-328, M.I.T., Cambridge, Mass. Gret-CHEN A. PALMER, Assistant Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

As this goes to press, the Alumni are well launched on the drive to raise sufficient funds for the erection of a badly needed gymnasium and field house at the Institute. It was my pleasure to attend a meeting of the Class Secretaries at which President Compton, Harry Worcester '97, and others prominent among the Alumni described the great need for these two buildings. There has never been the slightest doubt in my mind but that the athletic facilities of the Institute have always lagged far behind the educational side. Plans for the proposed buildings were exhibited and appeared to be exceptionally well thought out, effective in accomplishing their purpose, at the same time having regard for the need to keep cost down to a reasonable amount. It seemed almost unbelievable to me that so much could be accomplished with the funds requested. We are particularly interested in having the Class of 1919 compare favorably with other Classes of our time in the percentage of subscriptions. We have had varying degrees of good fortune since leaving the Institute, and each individual is the best judge of the size of his contribution. It appears inevitable to me that the more fortunate of our Alumni will surely feel justified in contributing in their customary generous manner if a high percentage appear as contributors.

Since graduation from the Institute I have frequently found it necessary to go back for information and assistance of one kind and another, and I know of no other college where graduates can obtain more whole-hearted support and coöperation, whatever may be their need. This has always been a source of great satisfaction to me. The Drive headquarters have already reported that our Class is taking hold nicely, so be sure to do your part; if you have not already sent in your subscription, please do so at once before you forget. Remember, it is 15 years since the Alumni have received a similar request.

A couple of clippings of interest appeared in the Boston papers recently: Elisabeth Coit, formerly of Winchester, Mass., but now a New York architect, won one of the American Institute of Architects awards for 1937. As a result she will investigate methods of economical design and construction of singlefamily and apartment houses in the eastern part of this country. These awards were made "to develop better, and not more, architects," through advanced study, research, and travel. There appeared also the announcement of the recent marriage in Springfield, Mass., of George Frederick Magraw and Dorothy Lorraine Morrow, a graduate of State Teachers College in Salem and of Boston University

We received word from Lloyd R. Sorenson, VI, who is now assistant naval architect of the Newport News Ship-building and Dry Dock Company, Newport News, Va. Sorrie's family is coming along very nicely, the present roll call being Lucy, six years; Lloyd, Jr., four years; and Sylvia, two. I remember very clearly in the fall of 1918 when Sorrie and the writer migrated to Virginia to fight the battle of Newport News, along with about 30 other members of the Class, but I believe he is the last of the Mahicans. He writes that he is in charge of getting out hull drawings, which must be a mansized job in a plant of that extent and

prestige.

We had another get-together of those of the Class around Boston on Tuesday, November 23, at Walker Memorial. After dinner, Ralph Jope '28, Secretary of the Advisory Council on Athletics at M.I.T., gave an excellent talk on the design of the new gymnasium. We then went downstairs for some very heated competition in bowling. After adding up the final score, the first two teams were tied at 1,005, and a third team was only two points behind. Those who were there were Alan Richards, Marshall Lee, S. J Hays, Carl Svenson, Bob Hackett, Bill Banks, Art Blake, Frank Reynolds, Jim Holt, George McCreery, and the writer. Incidentally, George has just been presented with a bouncing baby girl. -How about sending in a few more notes, fellows. We are running low, and news of the Class cannot be obtained out of thin air, as yet, in spite of the progress of scientific research. - ARKLAY S. RICH-ARDS, Secretary, 26 Parker Street, Newton Center, Mass.

All yearners for the inspiration of a Technological Toot welcome the advent of another year and its unfolding of the new series of dreams come true on the banks of the Charles. The home-coming of Course IV, a new wind tunnel, added educational facilities, and, above all, new dormitories and really adequate provisions for student life are a few of the high lights which mark the year 1938 of the Compton era. In wishing all of you a year of similarly outstanding personal progress, may we remind you of your duty and privilege in participating in the Alumni Association's contribution to these new developments. If you've forgotten to send in your pledge to the Alumni Drive Fund, won't you complete your card now and celebrate the New Year in the full enjoyment of a good thing well

Right on the heels of Ray St. Laurent's brief stopover in New York came the Automobile Show and Paul H. Rutherford, chief engineer of Delco Products Company of Dayton, Ohio. It was our first meeting with Paul since graduation and we had a long and enjoyable session

to make up for lost time - in the midst of General Motors' swanky and instruc-tive showing of all products at the Waldorf-Astoria. He's still the same Paul we knew of old, little changed by the years. Mrs. Rutherford hails from Lynn and there are two fine daughters, Alice, who is 11 years old and Nancy, aged six. Paul admits a consistent golf score in the low 80's and threatens to take top honors at our next reunion tournament. He frequently sees Dugie Jackson, Jr., director of Lewis Institute in Chicago, and was planning to visit Ray on his way to the Yale-Dartmouth game at the close of the New York show. Paul makes his home at 510 Alameda Place, Dayton, where our best wishes are directed.

Henry R. Kurth, our representative on the Alumni Council, dropped in with Mrs. Kurth during a combined business and pleasure trip to the big metropolis. At least the "pleasure" portion consisted of attendance at the Army-Notre Dame game, and we haven't checked with Chick to get his slant on the grudge that the weatherman worked out on both spectators and players! Chick is doing a splendid job in heading the class activities in the Alumni Fund Drive in the Boston area, and he deserves the loyal support of all members in that vicinity to assure the success of our part. He is still assistant system chief in the operating department of the Boston Edison Company and lives at 8 Healey Street, Cambridge.

Seen at the November smoker of the M.I.T. Club of Northern New Jersey: Bill Brown, Max Burckett, Chink Chatham, Cac Clarke, Bill Emery, Sumner Hayward, and Fred Kowarsky.

Recent changes of address include those of Dana A. Barnes, 615 James Street, Syracuse, N.Y.; Charles L. Beazley, 9 College Street, Halifax, N.S.; Arthur N. Brambach, Educational Department, International Business Machines Corporation, Endicott, N.Y.; Dr. John Campbell, 25 Coolidge Avenue, Glens Falls, N.Y.; George A. Chutter, 205 West Wacker Drive, Chicago, Ill.; Captain John P. Dean, West Point, N.Y.; Edward M. Epstein, Ducilo S.A. Productora de Rayon, Berazategui F.C.S., Argentina, S.A.; Newell A. Grover, State of California Bay Bridge, 500 Sansome Street, San Francisco, Calif.; C. Harry R. Johnson, 22 Scarborough Road, Manchester, Conn.; Victor S. Phaneuf, 14 Auburn Street, Nashua, N.H.; Charles W. Richards, Continental Paper and Bag Mills, Rumford, Maine.

How about enriching your Secretaries' lives, too? Write us a letter, a post card, or just tell us to go jump in the lake—but write!—RAYMOND A. ST. LAURENT, Secretary, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, Assistant Secretary, 10 University Avenue, Chatham, N.J.

1923

The big news currently relates to the Alumni Fund work. If you haven't already sent in a contribution or pledge, let's hear from you. Nevertheless, a few

items have come in: Thomas H. Boyd, XIII, is general foreman of the molded brake lining department at the Manhattan Rubber Manufacturing Division of Raybestos-Manhattan, Inc., of Passaic, N.J. He suggests that the 25-year endowments taken out by many of us in favor of the Class be assigned to the Alumni Fund. Do any others feel the same way? Boyd apparently realizes some of the practical difficulties of such a plan, as the endowments would not mature for another ten years, for he makes the offer to pay up the remaining installments on his policy instanter, and thinks many of the others who have kept up payments thus far might be willing to do the same. Against the feasibility of this procedure, of course, must be balanced the fact that in another ten years there may be some other project, the objects of which are at least as worth while as the Alumni Fund, and moreover, there is the natural appreciation of the endowments in another ten years to be figured on.

Norman Weiss, III, writes a note from Santa Barbara, Chihuahua, Mexico. He is with the American Smelting and Refining Company. — Nearly 20 members of the Class in the Boston area showed up at Walker Memorial on the evening of November 15 for an informal dinner, the first of some four gatherings which will be attempted this winter and spring — two dinners and two luncheons. It was a very pleasant meeting, with several new faces of men who had not previously shown up at noonday luncheons such as were held last winter. Set down from memory (and I hope I haven't missed anyone), the following are the names of those present: Benjamin Albert, VI, Prentiss B. Alger, VI-A, Horatio L. Bond, XV, Harold F. Cotter, X, Gerald A. Fitzgerald, VII, Joseph Fleischer, VI, Nathaniel H. Frank, XIV, Harold B. Golding, II, Charles Goldstein, III, Leo V. Goriansky, IV, Robert E. Hendrie, I, Erling Lieberg, I, James A. Pennypacker, XIII, Bernard E. Proctor, VII, Howard F. Russell, II, Alfred C. Whiting, II, and Archibald Williams, Jr., XIII. — Hora-TIO L. BOND, Secretary, 18 Jefferson Road, South Braintree, Mass. James A. Penny-PACKER, Assistant Secretary, 96 Monroe Road, Quincy, Mass.

1924

As these notes for the January issue of The Review are written in November, it is not possible to make more than a preliminary report on the progress of class subscriptions to the Alumni Fund Campaign. Returns indicate, however, that members of the Class are coming through in fine style, and it is hoped that all those who have delayed contributing will take advantage of the new year to do so. We still want the Class to have 100% representation, even though some of the subscriptions are not so large as the donors would like them to be.

Fall River papers reported in November the marriage of Vin Lysaght to Miss Helen Dorothy Regan of Taunton, Mass. Following a cruise to Nassau and Havana, the Lysaghts are at home at Beaufort Gardens, New Rochelle, N.Y., while Vin's business hours are spent at the Wilson Instrument Company of New York City. — Edward Saibel, assistant professor of mathematics at Carnegie Institute of Technology, has, in addition, been appointed a part-time instructor in the same subject at Mount Mercy College, Pittsburgh, Pa., according to announcement by officials of the latter college.

Course XIII, via Gordon Joyce, provides a few interesting notes for this month: Frank Rousseau, taking a few weeks off from his artist studio at Lyme, Conn., to attend a reserve officers' camp, discovered that a fellow officer was Ed Russell, on leave from his duties with the Telephone Company in Boston. -Jimmie Wong, according to prewar reports, was with the Blue Funnel Line in Hong Kong. — Elliot Thayer is doing naval construction at Fore River and frequently takes part in trial runs under Navy auspices. - Guild Holt, far from sea with the National Biscuit Company in New York, is a resident of West Nyack, N.Y.

Here's a recommendation for any member of the Class for whom age has dimmed some of the high ambitions he once had, or who occasionally wonders just what an engineering training does for a man: Get from your bookseller or library a copy of the biography of our former President, Richard Cockburn Maclaurin, written by Professor Pearson. You'll have difficulty laying it down until you've finished its last page, and when you have done that, your opinion of your education, your Institute, and yourself will cause you to hold your head at least two inches higher. It's the best pump primer we've seen. - Francis A. Bar-RETT, General Secretary, 50 Oliver Street, Boston, Mass.

1925

Many thanks to those of you who have written in response to the class letter. How about some word from the rest of you? - Ken Prescott, I, the first Secretary of the Class back in 1921, reports that he is employed as junior civil engineer with the Massachusetts Department of Public Works. Construction work in the Berkshires occupied him for seven years, after which he was transferred to Boston on preliminary estimates, further construction, and now maintenance. In November, 1927, he had some interesting experiences in the flood area around North Adams and in the spring of 1936 found further floods to combat in Middlesex County. He has been married for nine years and has two boys, Dick aged four years, and Bob aged three. - Another civil engineer, G. N. McDaniel, Jr., has now become a successful independent oil operator. For several years he was with the Gulf Oil Corporation as production engineer in the Texas Panhandle and two years ago entered the oil business for himself. He now has several producing wells of his own, and is president and general manager of two oil corporations.

Nelson D. Malone, former Course II Secretary, writes that he is now located in New York. He is still associated with the Boston Manufacturers Mutual group of fire insurance companies and may be reached at 570 Lexington Avenue, New York City. - Announcement has been received of the marriage of Miss Mary G. Welch of Roselle, N.J., to Stanley C. Lane, V, on Saturday, October 23, at Elizabeth, N.J. The bride is the daughter of Mr. and Mrs. Thomas G. Welch of Madison, Wis. The Lanes are residing at 111 West Seventh Avenue, Roselle, N.J. - James C. Evans, VI, is now administrative assistant to the President of West Virginia State College. After completing his graduate work in 1926 and receiving the first Harmon Award in science on the basis of his graduate research, he went to Miami, where he gained two years of good practical experience in the boom construction, the hurricane destruction. and some of the subsequent reconstruction. He became instructor in electricity and mathematics at West Virginia State College in 1928 and shortly became head of the department of mechanic arts. Developing a new program, a new building, and an enlarged staff and student group has brought him to his present position.

Tom Price, who is now back with the Hammermill Paper Company at Erie, Pa., tells me that at a recent meeting the Barkon-Frink Tube Lighting Corporation of Long Island City, N.Y., exhibited the new Barkon carbon dioxide daylight lamps which are now creating considerable interest in the paper and pulp in-dustry. Three standard models and a new portable model were shown. In attendance at the exhibit were Frank McGinnis, VI-A, President, and Thomas J. Killian, VI-A, of the same concern. — Justin Peterson, also VI-A, of the General Electric Company, West Lynn, Mass., was recently granted a patent by the United States government on a starting circuit for electric discharge lamps, the patent being assigned to General Electric. I am informed that John R. Lyons, IX-B, is now with the Pratt and Whitney Company at Hartford, Conn. He is mar-

ried and has one daughter. A letter from Charles M. Cooper, X, reads as follows: "My travels since 1925 have not been to distant lands but at least have been most interesting - to myself. First came a spell with the research lab. of applied chem. of the Chemical Engineering Department, starting with laundry problems (believe it or not) and ending with high-pressure gas syntheses. Then in the interest of science, heat transfer, and Professor MacAdams ['17], the slip stick smoked and the pencil scorched reams of paper. Came an apprenticeship in the Practice School under Professor Harold Weber ['18] at the old Winchester Station, followed by several years as director of the Bangor Station. There, 'twas said, the students learned to take the Mount Katahdin trip with a smile if they looked for a good grade. But by and by the Du Pont outfit began to look good, and now they have me here

in Charleston in the state of West Virginia — the Switzerland of America (shades of the White and Green Mountains and even the Blue Hills). To make the round complete, I'm once again engaged in high-pressure gas synthesis though on a slightly larger scale than in 1926. I've been married long enough to have trouble remembering the date, and am blessed with a daughter who can propound more difficult questions and ask why' in a greater variety of ways than the sum of the ten best (or worst) profs on the staff in dear old '25."

Ralph Ilsley, XII, reports from Washington, D.C., that he is no longer with the National Research Project on Reemployment Opportunities but, since July 1, has been chief of research and statistics in the consumers council division of the National Bituminous Coal Commission. Associated with Dr. Ilsley is Harry P. Sweeny '08. Ilsley has also met Joseph Cashman, V, in Washington. He is a patent attorney, specializes in the field of chemistry, and has spent considerable time in Washington since graduation, studying and practicing patent law. — Waldemar S. Broberg, captain in the Army Ordnance, is now located at the Rock Island Arsenal in Illinois. From 1928 to 1932 he was instructor at the Military Academy at West Point, and from 1932 until his recent transfer was working in the New York area. - Henry C. Trask, XV, writes about some of his recent activities. Several years ago he formed the Trask Engineering Corporation, which deals chiefly with industrial oil burning and power equipment and industrial air conditioning. He has handled some good-sized jobs, including some in the Copley Plaza, Bellevue, and Brunswick hotels in Boston. Last spring he formed another corporation known as the Amusement Development Corporation, of which he is treasurer. This company constructed the new Derby Racer roller coaster at Revere, which Trask operated during the summer, at the same time controlling a restaurant, jungle show, and apartment house in addition to his regular business. In 1935 he traveled in Santa Domingo and Puerto Rico, and in 1936 covered the whole state of Florida. Despite all these activities, he has also found time to obtain his captaincy in the 371st Engineers.

James F. McIndoe, XV, responds from Portland, Ore., where he has been located since 1932. From 1925 to 1932 he served in various capacities with the American Radiator Company, working in Buffalo, St. Louis, Texas, Oregon, and Washington, covering an average of twenty thousand miles per year. Following further work with the American Radiator Company and the Consolidated Supply Company, between 1932 and 1936, he became sales manager for the Peerless Pacific Company in February, 1936. In addition to business, he cites two very good reasons for settling in Portland: First, he was married in September, 1935, and, second, there is a son and heir who arrived last summer. — E. Bradford Nichols, also XV, tells me that he is a member of the faculty of the Weltman Conservatory of Music in Malden, Mass., and is also taking courses at the Harvard Graduate School of Education in preparation for secondary school administration. From the Mid-Pacific comes a letter from Frank D. Klein, XIV. He writes as follows: "I have just completed a tour of duty of eight years at the Air Corps material division, which is located at Wright Field, Dayton, Ohio. The division is responsible for engineering, procurement, supply, and industrial war plans for the entire Air Corps. My chief duties there were in charge of development of aircraft fuels and lubricants.

"On August 4, I sailed from New York on the Army Transport Republic, for a two-year tour of duty in the Hawaiian department. After a very pleasant trip lasting for a full month, with time for visiting in Panama and San Francisco, I arrived in Honolulu and was assigned to the Hawaiian Air Depot as assistant engineering officer and chief inspector. The depot is charged with Air Corps supply and airplane and engine overhaul for the Hawaiian department, which at present consists mainly of two fields. Wheeler Field is located at Schofield Barracks, the Army's largest post, near the center of the Island of Oahu; it houses a pursuit group, consisting of pursuit and attack squadrons. Luke Field is located on Ford Island, adjoining the Pearl Harbor Navy Yard; it houses a composite group, consisting of bombardment and observation squadrons, and also the Air Depot. A fleet air base of the Navy is also located on one side of Ford Island. — Because of the increased space required by both the Army and the Navy, a new field, Hickam Field, is now under construction adjoining the Navy Yard. When completed, the composite group and the Air Depot will move there, leaving Ford Island entirely to the fleet air

"The scenery here is lovely, and the lights are beautiful at night because of the way the city is built around hills. Pretty rainbows can be seen frequently. Thunder and lightning are very rare. The climate varies somewhat in different localities but in general it is about as near ideal as could be expected anywhere. The sun shines most of the time in some parts, whereas rainfall is frequent in other parts. The mountain peaks almost always have clouds hovering on them. In many places, particularly in certain valleys, it showers frequently with the sky clear overhead; this is due to rain blowing down from the clouds above the mountain peaks, and it is commonly called 'liquid sunshine.' The beaches here are small and not at all like mainland beaches, but the water is always an ideal temperature for bathing. The Islands here have a fascination all their own, with more friendliness and less bustle than is found at most mainland places. It would take a long time to tire of the pretty Hawaiian music and grass skirts.

I am sorry to report the deaths of George W. Sensenich, XV, and William Neidert, XIII. Sensenich died in February

at Portland, Ore.; Neidert, who was stationed at Mare Island, Calif., on the U.S.S. Rigel, passed away on November 4. — From information furnished through the Register of Former Students, I learn that Ray N. Wheelock, II, who has been located at Hercules, Calif., is now residing at 3616 Washington Street, Wilmington, Del. — L. R. Van Wert, V, has resigned from the department of metallurgy at Harvard University and is now associated with the Leeds and Northrup Company in Philadelphia. — Edgar R. C. Ward, VIII, has been promoted to a captaincy and has been transferred from Fort Munroe to Wellsboro, Pa., while Nicholas A. Draim, XIII-A, has recently become a lieutenant commander and has been moved from Pensacola, Fla., to the U.S.S. Saratoga at Long Beach, Calif.

I wish to take this opportunity to extend the New Year's Greetings to every member of the Class; will each of you make a resolution, and keep it, to write the Secretary at least once a year.

—F. LEROY FOSTER, General Secretary, Room 6–202, M.I.T., Cambridge, Mass. Hollis F. Ware, Assistant Secretary, 17 Green Road, Medford, Mass.

1926

Two engagements grace the class-note folder this month: that of Richard Pough of New York City to Miss Moira Flannery of that city, and that of Wallace Sanderson of Brighton to Miss Ellen Perkins of Brockton. Said the New York Times (October 10) of the first engagement: "The prospective bride, whose mother was the former Miss Claribel Spiess, is a granddaughter of Count and Countess Naselli of Rome; a niece of Mr. and Mrs. Elie Nadelman of Riverdale-on-Hudson, and a cousin of Donna Guido Branca of Potenza, Italy. Mr. Pough is descended from the Warren, Dudley, Otis and Cotton families of New England.' Wallace Sanderson is associated, as a chemist, with the Barre Wool Combing Company in Barre, Mass.

It is a pleasure to report that William H. Hoar has successfully recovered from a bout with pneumonia and that Red Libbey finally was moved to write the Secretary of the fact that he had not received his Review. Since July he has been in International Falls, Minn., where he is working for the Minnesota and Ontario Paper Company. - George A. Booth has moved from the Boston district to 157 East Cypress Avenue, Lompoc, Calif. — Nicholas N. Sinitzin is with the Helicopter Corporation of America in Long Island City, N.Y.—Charles E. Tonry has left Tulluride, Colo., and is on the staff of the Desert Silver Mines, Inc., at Silverpeak, Nev. Shepard Vogelgesang, one of our star architects, had an article in the Chicago Times, Sunday, October 24, on the art work sponsored by the Federal government. Shep, it will be remembered, was affiliated with the Century of Progress Exposition in Chicago and has been a consultant also on the New York Exposition. He has been particularly active in the field of industrial design.

The Secretary has never adequately limned the achievements of one of our classmates right here under his nose, Cedric Valentine, now coach of crew here at the Institute and rapidly earning fame as a builder of racing shells. Valentine took over the coaching job this fall, vice Bill Haines. His boatbuilding business has been developed over the last few years and received considerable impetus last spring when the Technology 150pound crew won the intercollegiate regatta at Princeton, racing in one of his boats. Valentine has kept alive the traditional prowess of the 1926 150-pounders, and many of us have great confidence that he will extend this ability to other crews at Technology.

Another noteworthy '26 man here on the lot is Ted Müller, who is teaching industrial design at the Institute, a relatively new field academically but one which holds much promise. Ted has recently opened a Boston office in addition to his New York headquarters and is now living in Boston. He has an active practice in industrial design, in addition to his

teaching.

In the Alumni Fund Drive there is naturally competition among adjacent Classes. The Secretary has just examined class records and finds that '26 leads '24, '25, '27, and '28 in the total amount contributed so far. The lead, however, is slim and may be wiped out at any minute. The Secretary, nevertheless, is optimistic that the Class will stay at the top of the list, with Joe Levis working as general chairman, Elton Staples as Boston chairman, and George Leness as New York chairman. These three are being assisted by many men whom we hope to list in a future issue. Individual gifts so far have ranged up to \$500. — J. Rhyne Killian, Jr., Secretary, Room 11–203, M.I.T., Cambridge, Mass.

1928

The most important message we can bring to the Class is the reminder that we must all get behind this Alumni Field House and Gymnasium Drive and give it our best support if we, as a Class, are going to be up to par. So far quite a number of '28 men have sent in generous contributions, and these have been appreciated and acknowledged. However, our Class still has a real mark to shoot at if we are to meet the challenge of the Class of 1926 or the records of other Classes near us. Please don't delay your gift to the central alumni committee another day. Everyone, from President Compton down to the lowliest freshman in the Class of 1941, realizes the need for better student facilities at the Institute — it's the most worth-while project we could be called on to support for improving student life, so let's put it over. Send your check now and remember you can pay your gift in four parts, every six months for two years.

From Ed Birkenwald at 16 North Chestnut Street, Augusta, Maine, has come word that a new daughter, Marcia Caroline, arrived on September 30 weight six pounds, 14.5 ounces. All that Ed would say beyond that was: "Both parents and child are doing nicely." The Class sends its best wishes to Marcia and her happy parents. — Did you know that our own Benjamin K. Hough, Jr., now of Ithaca, N.Y., delivered a paper on an "Investigation into the Stability of Embankment Foundations in Its Relation to Soil Mechanics"? This speech was made before the joint session of the Engineering Institute of Canada and the American Society of Civil Engineers at the Hotel Statler in Boston. Congratulations, Ben; it looks as though you were on the way to bigger things.

The Boston Herald carried the news of Samuel Bailey Smith's marriage to Miss Florence Margaret Hurlbut on August 7 in Ogdensburg, N.Y. The Smiths took a wedding trip to Ottawa through the Thousand Islands, and they are now at home on Wayne Avenue in New York City. Our sincerest wishes. - Gordon Rogers is now at 1101 Dolphin Street, San Pedro, Calif., and is working in the Los Angeles refinery of the Union Oil Company. Before that, Gordon was superintendent for the Merritt-Chapman and Scott Corporation, but when they closed their West Coast office a few years ago, he changed his work and went with Union Oil Company. Henry Dean is also with the Union Oil Company of California and, to judge from recent reports, seems to be doing very well.

Before closing this column, I am going to make a special offer. Unless we get letters, these words can't be very interesting. Therefore, I'll make the personal offer of one carton of cigarettes to the fellow who writes me the best letter on the subject: "How I Would Encourage More '28 Men to Write Brief News about Themselves for this Column." Remember, for the best letter on this subject, the winner will get one full carton of popularbrand cigarettes. Use as many words as you need. There are no tricks. No box tops are required. Merely a small prize for the most constructive letter encouraging '28 men to send in the news. GEORGE I. CHATFIELD, General Secretary, 5 Alben Street, Winchester, Mass.

1930

It is with deep regret that we record the passing of Richard G. Orleman, II, in New York on October 8. Since graduation Dick had been on the staff of Jackson & Moreland in Boston and was a member of our five-year reunion committee in 1935. To his parents and to his brother, Carl '31, V, the Class sends sympathy.

An all-Technology affair was the wedding on October 30 of Walter S. Bennett, II, to Miss Mary A. Cudhea of Brighton, Mass. Walter thus becomes the brotherin-law of two other members of our Class: George Cudhea, XVI, and John Scheuren, Jr., XV. — The following Saturday evening, Ed Rhodes, XII, took as his bride Miss Gertrude Peterson of Waltham. The newlyweds are now living in Cincinnati. — Congratulations from the Class are in order!

Once again may we remind all members of the Class who haven't yet signed on the dotted line that the Alumni Fund

Campaign needs the support of every Alumnus if the new recreational facilities are to be provided for all Tech men of the future. — PARKER H. STARRATT, General Secretary, 75 Fenno Street, Wollaston, Mass.

1931

Through the newspaper columns we learn a great deal about the Class. Bob Snyder is now with the Bancamerica-Blair Corporation in their Boston office. having arrived at that destination via the National Shawmut Bank, where he was doing securities analysis work, and the sales department of Ballou, Adams, and Whittemore. — Last summer Joe Birdsell was married to Miss Beatrice Gilbert of Englewood, N.J. Joe is teaching at Harvard, and the couple is residing in Cambridge. — Henry Hartwell was wed to Miss Constance E. Nash of South Weymouth during the past summer. - Miss Suzanne Burton Shader became the bride of Bob MacNeilly in Wenham, Mass. The couple is residing in Forest Hills, Queens. — Announcement has been made by Mrs. Sidney Gallert of Commonwealth Avenue, Boston, of the marriage of her daughter, Miss Rosalie Peavy Gallert, to Hymen Davis. Hymen, with Mrs. Davis, is living in New York City, where he is now affiliated with an architectural engineering firm.

Allen Wilson was married to Miss Janice Mackenzie of Newton Center in the Piety Corner Chapel in Waltham and is living in Waltham. — Don Holden was married to Miss Eleanor West Watson of Newport News, Va., on September 4. After remaining at Tech for his master's degree, Don went into the shipbuilding business in Newport News. - Another September wedding was that of Francis J. Herrmann to Miss Ruth Dorothy Eckstein of New York. - In still another September wedding, Henry D. Addison took as his bride Miss Louise May Alcott of Watertown. Both now live in Florence, Mass. - Miss Helen Saathoff became the bride of Ralph Davis at a ceremony held in South Orange, N.J., on October 30. Ralph and Mrs. Davis are living at 10

Forest Street, Cambridge.

That just about exhausts my supply of news. Of course there is plenty to be said concerning the Alumni Fund Drive, but you hear about that without further comment in this column. As a suggestion, however, why not accompany your pledge card with a little information concerning yourself? — BENJAMIN W. STEVERMAN, General Secretary, 11 Glenland Road, Chestnut Hill, Mass.

1933

We had a class dinner in New York during November and had a rather nice turnout, which helps the news along. Guido Garbarino was there and is still working for Crowell Publishing. — Bill Huston was also there, and he told of the present work with the magazine, Rising Tide, which will probably be distributed before this news reaches you. The magazine, a new venture, is starting off with a publication of one million copies and is

being printed in nine languages. From what Bill tells us of it and the prepublication demand for it, you will probably have seen a copy of it by this time and you will be interested to know that Bill was behind it. - Cy Hapgood was also there and he has been engaged in patent law since he left the Institute. Cy attended Fordham, finished law school in 1936, and has since passed his bar exam. Dill Collins was there and mentioned he had seen Bill Miller, who is now in the Post Office Department of Scranton, Pa. He also mentioned seeing Bill Wessel. who is with the Warren Foundry and Pipe Corporation of Dover, N.J., in the capacity of chemist. Bill also told us that Paul Netherwood is with the Arnold Print Works in North Adams, Mass. Bill Gray was at the dinner, too. He is still with R.C.A. but had nothing to report. - Hart Cirker, another present, is still with Du Pont at Arlington, N.J., in the plastics department and he is working on a noninflammable celluloid. Dave Treadwell is in the same department with him and is working on a new type of safety glass. — Bill Keith, who attended the dinner, is with Dun and Bradstreet. He sees Charles Woods occasionally. H. W. MacDonald was also present. He is with the Simmons-Boardman Publishing Corporation in the capacity of associate editor. He was married on October 23 to Miss Barbara Leal Hadden of Plainfield, N.J. - Sam Lieben was likewise at the dinner. He is connected with the Babcock and Wilcox Company designing steam boilers. He was formerly employed by the Electric Boat Company in Connecticut. He told us that before he left the Electric Boat Company, Herb Larrabee was working there with him.

In connection with the dinner, we received word from some of the boys who were not present. One of these was Edward W. Kimbark, who received a doctor of science degree in electrical engineering last June. He says he spent the summer working at General Electric Company at Schenectady and this fall started as assistant professor of electrical engineering at Polytechnic Institute of Brooklyn. V. O. Bowles sent a card, telling us he is working with the Lummus Company in New York City. - Jim Hayes wrote us that he is now with the Carrier Corporation in the construction department at Syracuse, N.Y. - O. H. Somers wrote that he is still with Anchor Cap Charlie Bell dropped us a card and told he is working with United Shoe Machinery and is now living at Marblehead, Mass. - Morris Guralnick expressed his regret at not being able to attend our meeting but said that he was a father and that the newcomer, Steve by name, requires lots of attention. - Milton Benson wrote that he is living in Baltimore, where he is working at Johns Hopkins. John W. Gardner let us know that he is with the National Grain Yeast Corporation of Stafford Springs, Conn.

Through the Institute's clipping service we received several announcements: The wedding of Dave Nason to Miss Gertrude Dunham Cooke took place in Arlington, Mass., on October 25. They plan to live in Boston. Dave is in the insurance business. The wedding of Ivan Alexander Getting to Miss Dorothea Louise Gracy took place in Cambridge, where they are living. The wedding of J. B. McLean to Miss Jane Polson McGregor was a November event. They plan to live in Connecticut.

We also have an announcement from the Institute that Percy S. Gardner, Jr., joined the engineering staff of the Idaho Maryland Corporation at Grass Valley, Calif., and that Newton W. Buerger is assistant in geology at Queen's University, Kingston, Ontario. — A line from Tom Fitzpatrick tells that he has taken a position with Clemson College at Clemson, S.C., as professor in architecture. He is not practicing architecture at the present time.

That is my story for this time and as a parting word, let me remind you again of our five-year reunion the first week of next June. — George Henning, Jr., General Secretary, 330 Belmont Avenue, Brooklyn, N.Y. Robert M. Kimball, Assistant Secretary, Room 3-108, M.I.T., Cambridge, Mass.

1934

Our Class is still young in years, but there is one thing for which it is already outstanding - that is the number of General Secretaries who have carried forward the torch and then, due to some unforeseen circumstance, have been forced to pass it on. Again the finger of destiny beckons, and we are deprived of the very enjoyable anecdotes about our fellow classmen with which Bill Ball has been supplying us. He has done an excellent job of keeping us posted on the low-down and has set a high standard for me to maintain. But there is one thing that any secretary must have, and that is the cooperation of you men who read The Review. I will depend on your letters for information concerning the Class, both about yourselves and about others. There is not one of you who has not had some interesting experience about which the rest of us would like to hear. Many of you are located at the ends of the earth, and an account of your everyday surroundings and the customs of the people would be very interesting to the rest of us. Whether you are in the States or abroad, we want to know what you are doing.

There seems to be a good crop of weddings and engagements for announcement this month: Phil Daniel took the final step on October 23 with Miss Helen Pleasonton of Brookline. Mrs. Daniel is the daughter of Mrs. Bacon Pleasonton and Francis Rodney Pleasonton of Philadelphia. The couple will make their home in Charleston, W.Va. — Edmund Sylvester, II, stepped off with Miss Betty Duval, Registered Nurse, on October 22, at a ceremony at St. Michael's Church in Milton. — Fred Hutchinson took the marriage vows, on October 8, with Miss Marion Tamme, daughter of Mr. and Mrs. Charles Tamme of New York City. Fred is employed with the Burroughs Company. — Richard F. Miller, who was graduated from Williams and took his

doctorate at Technology, marched altarward on October 22 with Miss Natalie Powers, daughter of Mr. and Mrs. Thomas H. Powers of Bridgeton, N.J. The bride and bridegroom are living in

Summit, N.J.

Two engagement announcements of interest are those of Teddy Rimbach and George Wuestefeld. Teddy is engaged to Miss Sylvia Hortter of Arlington and, since a December wedding was planned, the knot should be tied by the time this notice is published. Teddy is working as a sales engineer in the Chicago office of the Permutit Company. Woosty, who is working for the American Brass Company in Washington, writes the following: "You may print the fact that on September 26 Miss Ruth S. White and I were engaged at Lowell, Mass. No date has been set for the wedding." would be an interesting study to plot the number of marriages of Technology graduates against time elapsed since graduation. It would probably make a nice bell-shaped curve, with the peak at the three-years-out point. The peak would move forward or backward, depending on whether we were in a depression or a boom. I wonder which side of the curve our Class is now on.

I was in Chicago not long ago and ran into Ed Geittmann. Ed recently gave up his job in the accounting department of Chevrolet Gear and Axle in Detroit to take a position as assistant to the President of the Harvey Metal Corporation. The company manufactures all sorts of machine parts from nonferrous alloys, and Ed has his hands full learning about eutectics and casting properties of alloys. He has pretty much the run of the place and seems to be enjoying his job thoroughly. Before Mrs. Callan and I left Chicago, Ed took us out and showed us the town. We ended up at the Blackhawk Restaurant, where we danced to the music of Joe Sanders, the Old Left-Hander, and had a fine time chewing over old experi-

ences.

While we are on the subject of running into people, I was in Rumford, Maine, at the Oxford Paper Company last month and found Johnny Newbegin working in the engineering department. The company has been putting him through the mill during the last three years, and he has worked at everything from being a millwright to designing an electrolytic bleach unit. The man seems to have a charmed life, for he has had an unusually large number of narrow escapes around the mill. One time he had climbed upon the overhead crane above the paper ma-chine to untangle a chain fall. His foot slipped, and he fell backward for a distance of about 20 feet, but luckily a cart full of paper waste was conveniently located on the spot where he landed, so it was about like dropping into the middle of a feather mattress. Another time he was working on a scaffolding in the top of the digest room, about 60 feet above the floor. He was lying on one of the beams with his legs wrapped around it, driving a spike into the bottom of the beam. The hammer he was using glanced off the head of the spike, came up, and hit him in the eye. The sudden shock made him lose his grip with his legs, but he managed to grab the beam with his hands and dangle in mid-air until a couple of the millwrights rescued him. There were several other stories that he told me that were just about as harrowing, but I don't want to keep you awake all night. Johnny says the insurance companies won't issue him any accident insurance, but I think they are making a mistake, because I am sure that he has a guardian angel watching over him.

A few weeks before I landed in Rumford, Tuffy Emery and Johnny Westfall had been on one of their wild and woolly expeditions into the mountains, reminiscent of the ones they use to take back in school times. They left New York City on Friday night and, in the wee small hours, landed in Springfield, Mass., where they called up Johnny Newbegin and told him to meet them at North Conway, N.H. By the time the three of them had gotten together and had made ready what provisions they needed, it was late Saturday night. They went on to Crawford Notch and started about midnight to hike to Zealand Falls and Cardigan Notch. Before they had gone far, however, a heavy fog set in, so that they lost their way and spent the rest of the night wandering around in the woods. After daybreak the fog let up, and they started back for home. On the way they came to a lake, and all went for a swim, in spite of the time of year. That night Emery and Westfall drove back to New York.

I shall be looking forward to letters from you men, for fuel for this column, so please don't disappoint me. Writing a letter does not take much time. What takes time is thinking about the things you ought to be doing instead of writing the letter. — John G. Callan, Jr., General Secretary, 24 Quincy Street, Cambridge, Mass. Robert C. Becker, Assistant Secretary, South American Development Company, Apartado 655, Guayaquil, Ecuador, S. A.

1935

It is with regret that we mark the passing of one of our classmates, Richard F. Babcock. Dick was killed in an airplane accident on October 26. He was piloting two passengers over New York State when, according to witnesses, the motor started missing fire and the plane crashed in a field. Unfortunately, in the November issue of The Review I passed on some news taken from the newspapers which stated that Dick had eloped. This was later denied, and I wish to correct my previous statements.

Turning to more happy thoughts, I have the usual crop of marriages and engagements to report. Donald F. Taylor and Meredith Haines are engaged. The most recent information I have about Don indicates that he is working for Bethlehem Steel Company in New York City. August Zinsser and Carol Smith of Cambridge are also engaged. August did graduate work during our tempestuous

years at the Institute and is now working for the Sikorsky Aircraft Company of Connecticut.

This business of reporting the doings of the Class leads to difficulties. As you must realize, my information is seldom acquired firsthand, except in letters. Usually the letters mention news items about several members of the Class and I have to depend on this information. Consequently, I occasionally report items which are untrue. (Note the correction above.) I pulled a similar boner regarding Ben Blocker. The following letter was the amusing result: "Thank you for the notices which you have been kind enough to give me in The Review since graduation. I don't know where you got this information but I will say that you are no Walter Winchell when it comes to accuracy. First you stated, back in the February issue, that I was working with the Rush Craft Company and was contemplating leaving the ranks of the bachelors. That was all very nice except for the fact that I was employed in the Rust Craft Publishers, Inc., and marriage was the furthest thing from my mind at that time. Well, I did not mind that very much. No damage had been done and, after all, I had myself to blame for not having written to acquaint you with the facts as they were. But, by heaven, when you came out in the November issue with the news that I was still working for the Boston Lithographic Company (there's no such place, you durn fool) and at that same time bearing glad tidings to the effect that I had been married last summer - that was the last straw. I suppose I'll just have to acquaint you with the facts firsthand.

"Yes, I'm still working for the Rust Craft Publishers (world's largest manufacturers of greeting cards) as chief and only chemist in the lithographic division. As you stated, the opportunities are great. I have, as a matter of fact, already begun to realize several of them. My status here and in the lithographic industry at large has been improving steadily - so much so that I decided that I had found my niche in this old world of ours. Accordingly the girl friend and I agreed to announce our engagement. That took place on May 25. The wedding date has been set for this coming February 22. The girl is Anne Waldman, Radcliffe'35 - Phi Beta Kappa, magna cum laude, and so on. Yes, you may print as much of this as you like, but for heaven sakes don't announce the date of February 22 as the birth date of our first born." I think the last sentence of Ben's letter is the "last straw" for a poor hard-working Secretary. However, many thanks for the straight dope, Ben. Accept my most humble apologies for

the errors.

A couple of months ago Bill Klehm came in to see me and had a few news items to relate. Bill has been working for his father, a plastering contractor, since graduation. He reported that Charlie Funk is a trouble shooter for York Ice Machinery Company in their air-conditioning division. — Nelson Thorp became the proud father of a girl, Sandra,

last March (approximately) and is in the real estate business with his father in Westerly R.I. - Pat Patitz has been roaming about Canada and parts of the United States installing boilers. — Gregg Fry is with the Travelers Insurance Company. I believe that he has an agency with his father.

Walt Stockmayer came in one evening and mentioned that the following have been seen in Boston (shame on them) recently: Ed Gelus, Wally Rostan, Ted Earl, Ed Edgar, and Cy Williams. The latter has been in the contracting business for several years and has been erecting homes on Long Island. Walt also contributed the following items: Walt Green is now working at Tech, as is Howard Mason. The latter is studying for a Ph.D. in organic chemistry (biochemistry). Joe Lancor is doing research in the Aeronautics Course at the Institute. Paul Goldberg is also studying at M.I.T., pursuing an elusive Ph.D. in inorganic chemistry. Charlie Sutton is in the math department of Brown University. Johnny Conway has been seen about the Institute, but Walt did not know his occupation. Bud Pflanz has moved to the Middle West somewhere. How about a few letters from you fellows to enlarge the above?

At last the class politician, Ned Collins, has come through with a letter. Here is his story: "I spent a graduate year in the School of City Planning, which I finished in May, 1936. Immediately upon completion of my graduate work, I left for Holyoke, Mass., where I spent four months working as assistant to the general foreman in charge of construction on the Holyoke-South Hadley Bridge. From Holyoke, I went to work in Providence, R.I., as a straw boss in charge of masonry work on a large hospital building. From Providence I went to Boston and spent two months working on the South Boston housing project, a job which I left in December. I knocked around for the first few months of the year (1937) trying to find something in the line of work but was not very successful. However, with the approach of spring, offers of jobs, like bananas, came in bunches. In fact, I had four offers within one day. One was to come to Pittsburgh and work for the Carnegie-Illinois Steel Corporation, which, as you know, is the largest private steel-producing company in the world and produces over one third of the world's supply of steel. (Is that advertising, Ed? I think we ought to charge you at the rate of \$100 per line.) In April of this year I began work for Carnegie-Illinois as a draftsman in the engineering offices at Pittsburgh, working on layout plans and concrete designs.

'After spending six weeks in the drafting room, I was transferred to the field to be an inspector in charge of work on the new Irvin Mill. This Irvin Mill is the largest private job in the world today and for the past five or six years as well. (You seem to go in for the larger things in life, Ed.) The total estimated cost of the mill is in the vicinity of eighty to ninety million dollars, so you can see it is really a huge job. While at the mill, I discovered

that Frank Muldowney was safety engineer in charge of the job for the John Hancock Insurance Company. Also on this same job was Si Lucofsky '36, XVII, and Dave Whitaker '37, IV-A. During August I was given the job of field superintendent in charge of the laying of 16,000 feet of 48-inch gas main, which was only a small part of the job but, in itself, cost one quarter million dollars. After finishing my work on the gas line, I was transferred from the field back to the office of Carnegie-Illinois. This last move was into the commercial division, where I am now located, working as an assistant to the manager of sales promotion on developing steel houses.

There are a great many fellows from the Classes 1933 to 1936 working for Carnegie-Illinois. There must be 10 or 15 whom I have met within the last two months at the alumni meetings. Sam Joroff'34, XVII, is now chief safety engineer on the new Irvin Mill since Frank Muldowney resigned his position with the insurance company to take a job as field engineer for the contractors erecting the mill." Many thanks for the letter, Ned. We will be expecting more from you in the future. In the meantime, get some of those lazy bums on the Irvin job busy sending in news about themselves. Use the old high-pressure salesmanship and get them to follow your example.

During November, Cope MacAllister wrote in to do his share in keeping this column alive. Cope related that Bill Keefe spent most of the last year in the turbine department of General Electric in Lynn. Last spring he was transferred to the plant in Schenectady, where Cope is working. Shortly after Bill arrived, he and Cope, together with two more General Electric test men, rented a cottage at a near-by lake where they kept (?) house. Bill left later and went to the turbine department in Chicago, where he is reported to be working on installations. Cope also mentioned that Vin Mooney was in Schenectady until last spring when he was transferred to the Lynn works where he is in the laboratory. As for Cope himself, he went with General Electric a year ago last August, working in the street lighting department in Lynn. After five months he was transferred to Schenectady where he has been doing commercial work in the street lighting department ever since. Cope says that it has been an interesting job, holding connections between the factory and engineers on one end and the sales organization on the other. He expects to be there for another year or so when he will probably be sent to a district office, preferably Boston. I have the same request for you, Cope, as for Ned Collins: Get some of the other boys in Schenectady to do their bit.

The final letter of the month is from Walt Stockmayer. It came just a bit too late for the last issue. It is a long one and very interesting: "The last time I wrote was about a year ago, and I guess some of you know that I'm back at Tech working for my Ph.D. in physical chemistry, the department being very kind in granting me a teaching fellowship. What with working in Walker, assisting in the qualitative lab, and taking a few courses, I have enough to keep my sleep average well below the eight-hour mark. It's grand being back here, though; on the whole, one could do much worse than be

a perennial schoolboy.
"But I ought to go back and try to tell about what I did during the last year and the answer is not much new. Having loafed exquisitely during my first year at Oxford, I had to raise the intensity of operation gradually, and achieved the maximum on the night before my thesis was due, when I had to stay up the entire night to finish. (It was just like studying for the Ec32 final, as Charlie Sutton will remember. Black coffee was the catalyst.) In spite of all this procrastination, I managed to get a few interesting results, which I am hoping to have published. The degree I got for the work was called bachelor of science, which in the English system is the counterpart of a master's degree here. It will take me at least two more years here to get the Ph.D., but I do not regret the time I've lost at

"From the last statement you must have gathered that I grew to like Oxford a lot more than I had at first. In fact, leaving was very hard, and I now entertain the faint hope of spending a third year there sometime. I have more or less analyzed this feeling in myself but can scarcely burden you with it here; certainly the formation of many friendships with both Americans and Énglishmen was a big

'I rowed the entire year, as I had done before, and once more was lucky enough to be able to row at the Henley Royal Regatta. Our college crew didn't do very well, being eliminated on the first day, but the social and sporting spectacle of Henley is more than enough to balance that disappointment. Stanley Baldwin put in an appearance on the last day, complete with bowler hat and pipe, and received a tremendous ovation, in which I did not join. (Off the track: The budding romance of one of my friends was terminated by a heated argument over the merits of this same admirable do-nothing.) A German crew won the Grand Challenge Cup, and greeted the crowd with Nazi salutes. What is more interesting, so did the Austrian winner of the Diamond Sculls, though the Nazi party and salute are banned in his country. These gestures were greeted with mixed cheers, boos, and hisses by the crowd. Well, there ended my rowing days, I guess. I have never liked any sport so well, and its abrupt finish after two years is hard to take. Before leaving the subject, I wonder how many of you know that Joe Smith, who stroked our freshman Field Day crew and who is now at Boston University Medical School, has been New England sculling champion for the past two years and hopes to compete for the Diamonds at Henley next summer. It would be good to have an old member of the Class win what is generally known as the most coveted amateur rowing trophy in the world.

"And now to such traveling as I was able to do. As you know, I tossed the golden opportunity away last summer by coming back here, and I can never forgive myself. (Apply the will-o'-the-wisp analogy.) But I did get to the Continent twice again for short periods. At Christmas time I spent four weeks in Germany, one with relatives in Stuttgart, and the other three traveling in a big circle which included Ulen, Munich, Nuremberg, Dresden, Berlin, Hamburg, and Cologne. My impressions of the country as a whole, and of the people's present political mentality, remained unchanged, except that the people seemed much more resigned to the inevitability of fighting the Russians. (For defensive reasons, of course! The 'ring of steel about Germany, you know!) Hitler has them under his spell. But I would be unfair if I didn't present the other side: At the expense of gold, beef, international good will, and freedom of speech, the Germans today have attained a general spirit of camaraderie which does not obtain in America or England. In spite of the sacrifices they must endure, in spite of the great unhappiness of the unconvinced minority, the great mass of the people is temporarily happy. I say 'temporarily' because I subscribe to the belief that the Fascist ideology will ultimately bring about its own destruction. It is impossible to consider the whole question without personal bias, as long as one mixes morality with politics in the slightest. I'd like to recommend Frederick L. Schuman's 'Hitler and the Nazi Dictatorship' for a critical and nearly objective study of the Third Reich. The author is a Chicago professor, of non-Jewish, German de-

"Nuremberg, for the short time I was there, was easily my favorite among German cities, with Dresden second. The former maintains its medieval aspect within the old city walls, and historical relics are legion. Unfortunately, the fact that Nuremberg is Julius Streicher's headquarters makes the place sometimes oppressive if one is inclined to worry about the future of civilization. From Albrecht Dürer and Hans Sachs to Julius Streicher is five or six centuries! That is what they call progress. Berlin was the typical big city. Tremendous riches and much poverty side by side, rackets and vice and all the rest. Dresden is ideally laid out and seemed, as did Potsdam, to transport me back to the culture of the 18th Century.

In July, before returning home, I got across once more, this time driving across northern France with a friend. We followed the battle line from Arras past Verdun, stopping to look at two battle places - the fort of La Pompelle, near Rheims, and the great fort of Donaumont, before Verdun. The whole experience was an emotionally profound and unstabilizing one, which I can scarcely put into words. The whole region was such pleasant green rolling country; but even where not a trace of war was visible, the consciousness of it hung on one's mind all the time, almost like a sense of

some great personal guilt. The huge cemetery at Verdun covered about ten football fields with closely spaced white crosses. Only a cross in the low brush (not a tree of any size for several miles) marks the spot where once stood the village of Vaux. At La Pompelle I found a piece of a man's upper arm bone in a shell hole. Near by was an abandoned German tank — and it was covered with the names and addresses of egocentric visitors, much like a summerhouse full of carved initials! I will have to leave it at those few disjointed sentences. In the meantime we have a one-minute silence on Armistice Day, and ship guns and oil to belligerents in both Spain and China whenever we can get away with it.

'So I went on to Germany once more, and spent a wonderful four days walking in the Black Forest with two of my German cousins. I got sore feet, but it was worth it. And there are always coincidences, for who should be sitting at the next table to ours in a Freiburg beer hall but Professor Wilbur ['26] of the Civil Engineering Department. After a final farewell look at Oxford, where I had to return to take my degree, I sailed on August 4 abroad the S.S. Europa. For five weeks I worked for the General Printing Ink Corporation in New York, as I had done the summer of 1935, and then returned here, not for 'technological toots' (as yet) but for more work than I have done since junior year. Quite a few '35 men still grace the corridors — among them Tony Dauphiné, Jim Libby, Howard Mason, Paul Goldberg, Leo Epstein, Paul Panagiotakos, Walter Green, and Mitchell Sieminski. (Since he wrote this letter, Walt told me that Paul Goldberg passed his doctor's exams.) Fiske King, with headquarters in Worcester, comes to Boston occasionally, but he's leaving next week (that was back in October) on a trip which will ultimately take him through most of the East and the South.

"That's about all the direct news I have. So I might add just a word about the drive for funds for the new gym, to urge you all to contribute whatever you can. Even if it's small, I think that it ought to be something. I base this plea on the conviction that here we have a chance partly to repay the benefits that the Institute gave us. You all know that your education cost more than you paid; and those men with industrial positions have certainly come to appreciate the value of Tech's high esteem in the eyes of industry's leaders. The success of this drive will help to keep M.I.T. on top, so even from the most selfish viewpoint, that must seem a worthy cause. The goal of the drive will require that the average gift from Alumni be rather large, so, while the members of the Class cannot compete in this respect with the older Classes, you should make your contribution as large as possible and spread it out over the next two years if necessary. The cost of your cigarettes over a two-year period would make a substantial contribution. If Bob will momentarily permit this column to degenerate into a personal ad, I'd like to apologize to some

classmates, especially Smitty, Bucky, Jack Ballard, and Mal Porter, for a laxity in correspondence second to none, with the promise to get down and write those letters soon. And let's keep this column going!'

You certainly set the example of how the fellows can make this column something to look forward to each month, Walt. As for the personal ad, anyone who will write a similarly good letter can have all the ad he wishes. I'd like to add just a word about the Alumni Fund Drive. There is not a member of the Class who is unable to contribute a little to the gym fund. It is interesting to note that not a few of the fellows who have so far contributed are not among the financially stable of the Class (including Stocky, some of the other boys still at Tech, and myself, who are struggling along on slim budgets to get a bit more education). Do your part and feel the satisfaction of having helped. — ROBERT . GRANBERG, General Secretary, McCulloch B-13, Soldiers Field, Boston, Mass. RICHARD LAWRENCE, Assistant Secretary, 111 Waban Hill Road North, Chesnut Hill, Mass.

1936

A recent letter from Al Horton indicates that much of his time now is occupied with directing the Class of 1936 division of the Alumni Fund Campaign. Really, Al is doing a great piece of work and deserves the support of every member of the Class. None of us has a valid excuse for delaying a moment longer in sending in his pledge card. Since we are not asking for a fixed sum from any person but for a contribution based on each individual's income, everyone must be able to give something. Moreover, the payment of the pledge may be extended over the next two years. Of course, all of us want to see this campaign go over the top; it is up to us to help it over by giving our support immediately.

Course I. The only faithful correspond-

ent I can find in the whole Course is Elliott Robinson. Elliott is now a teacher of algebra and general science in the Brockton Evening High School, working Monday, Tuesday, and Thursday evenings. He also works daytimes with Warren Clapp '35 on the construction of the new differential analyzer. - From Elliott, we find that Henry Mabie has at last located with a railroad company, as he desired. He worked all summer for the Commonwealth of Massachusetts but was offered a job with the Boston and Albany Railroad and accepted. He has been making some surveys on equipment and reports on ways the company can save money. - George Payne is in Chester, Pa., laying out a new plant for the Sun Oil Company. — Members of our group would be interested in the picture of Paul Robbins which recently appeared in the paper under the caption, "Professor." Robbins has been appointed to the staff of engineering at Cooper Union. Previously he had been employed by the Pittsburgh Bridge and Iron Works. Clayton Gates's work with the United

States Army has now brought him to Fort Belvoir, Va. - Finally, my work with Linde has brought me back to Buffalo where I am hard at work on research for the oxygen business. I have come to roost at 100 Highland Avenue,

Buffalo, N.Y.

Course II. The details have at last arrived of the wedding of Francis Peterson to Miss Winifred Clark of Wellesley College on October 16. The wedding took place at the Wellesley College Chapel, and the reception was at the Woodland Golf Club. Giving the occasion a distinctly M.I.T. touch was the presence of Richard Westfall as best man, and Paul Richardson, Fred Prahl, Marcus Warmuth, and Sanford Clark, Jr., as ushers. The bride was attended by Mrs. Paul Richardson (Virginia Marshall). Pete and his wife are living in Fishkill, N.Y.

After seeing Pat Patterson practically every day, since we work close by each other at Linde, I finally got him to write the following letter (November 21): "A long letter came from Cesar Calderon this past month. He has been kept busy working on air-conditioning installations in New York City, where he is employed by York Ice Machinery Company. To quote from his letter: 'The kind of work I have been doing far exceeded my expectations. First I spent the month of September doing some service work in New York City. Then I took part in various air-conditioning installations, Ford Motor Car Building, a new Woolworth store, and the Park Central Hotel. Next I spent a month doing some estimating and pricing at the export department, and at the present I am undergoing a three weeks' stay at their factory. In about a couple of weeks I expect to go to Philadelphia and spend three weeks with the Brown Instrument Company, whereupon I shall return to New York and, atter one more week of estimating at the Brooklyn office, I shall start on my way back to Puerto Rico. . . . In the estimating department at Brooklyn I ran across Migel, and here at the factory I found Bill Austin taking the regular three-month salesman training course. I understand he is attached to the Boston branch. Last week Leon Simons and I attended a rally of the Alumni Association at the Technology Club.' From the rest of his letter I gather that Cesar won't be back in this country until 1939, and I wouldn't be surprised to learn that he will be a married man when he returns.

The Course II fellows will be interested to know that John Benson, who used to put us through our paces in steam and refrigeration lab, came to work for The Linde Air Products Company at the laboratory here in Buffalo. -- Laddy Reday is making out well with his job in Cincinnati where he works for Graton and Knight. He reports that Al Musschoot, who is in the engineering department of Jeffries Manufacturing Company, Columbus, stopped in to see him when he came to Cincinnati to attend a mining convention. - A letter recently reached me from Rufus Isaacs. He is with Carrier Corporation in Newark. . . .

"Since I last wrote you, I have moved to 279 Sterling Avenue, Buffalo, N.Y., with three other men from the lab. We have a good-sized flat which is much better than the single rooms we used to have. Should any of the old crowd be passing through, we can fix him up for

Course VI. More engagements being announced include two from this Course: George Temple, Jr., is engaged to Miss Lorraine Wood of Cambridge and the Erskine School; and Daniel Finucane has chosen (or been chosen by) Miss Elizabeth Reardon of West Medford, a graduate of Simmons College. — Allan Campbell is working for the Northern Electric Company of Montreal. The only additional news we have to offer this month is given in the following letter from Dan Dannenberg, which was forwarded by Nick Lefthes: "Last November I was fortunate enough to secure a position with Arthur L. Nelson, engineers, in the Park Square Building in Boston. As you probably have heard, Dick Patterson had been working there since our graduation and Russ Bandomer, for about a month before my coming. The work is exceptionally interesting, and I have gained a surprising amount of experience in the most up-to-date methods used in modern power-plant design. As you know, this is my second trip out to the Midwest as a junior engineer for the firm.

'You're probably interested in knowing just what my work consists of; therefore, I'll try to give you a detailed explanation of it: It covers a very broad field — from the heat balances (a bit more complicated but more straightforward than those we studied in school) to the actual layout of the plant, including a very detailed study of the operation of almost all of the equipment in the plant. I know a great deal more than I ever imagined I would about steam boilers, turbines, pumps, boiler feed-water treating, desuperheaters, valves, piping, deaerating heaters, temperature and pressure-control devices, tank construction, and steam accumulators. I suppose you've noticed that I haven't mentioned electrical work. Well, I had intended once to specialize in that but have since taken more of a fancy to mechanical engineering. However, that doesn't mean that I haven't had any electrical work or that I am not interested in it; for I have done quite a bit of work on the actual layout of plant lighting and power systems and have enjoyed it. Probably the most interesting part of the subject is the economics. Naturally I am not referring to the type of economics we studied but actual cost comparison, the true indication of what is clever in the way of design. Also, I have become quite engrossed in subjects that previously I had considered very dull and uninspiring. For an example, I have spent days just studying pipe and piping systems and have found myself surprised at the lack of knowl-

edge on . . . [the] subject.
"Our office is an ideal place to really secure an engineering education. In fact, I feel that I have learned more there in one year than I could in four more years in school. And what is more, I have never had the feeling that my nose was to the grindstone, because of the jovial atmosphere there. This good fortune of mine has enabled me to thoroughly appreciate my education at good old M.I.T. Before I close, let me wish you and all the fel-

lows the best of luck. . . .

Course VI-A. The big news for this Course occurred the day after Thanksgiving when Bill Saylor was married to Miss Marion Mader of Cambridge. The affair was a private ceremony at the home of the bride. On Thanksgiving night, Bill's friends had a bachelor party for him — but Bill managed to show up in time for the wedding: Those attending the party besides Bill were Bob Sherman, best man, Elliott Robinson, Brent Lowe, Aaron Loomis, Jerry Chapman, and Tony Hittl. Bill is in Philadelphia as an engineer with the General Electric Company, working on circuit breakers for the electrification of the Pennsylvania Railroad. He and his bride are living in Upper Darby. - Mart Gilman writes to say that he has heard that Norm Willcox was married on November 20. A few of us had been expecting this announcement, so we are inclined to believe the news authentic. Mart says that Ed Halfmann is still in Philly, enjoying it greatly; Mart is still in Cambridge, doing the same. -Charles Hobson is in the transformer design department of General Electric at Pittsfield. Also with General Electric is Curtis Hillyer, but he is in Schenectady.

Course VIII. Coming out of the fog of matrimonial bliss, Charlie Evans has written us a good bit of news in the following letter: " . . . Carl Jacob says, in a recent letter, that he is once more walking the corridors of M.I.T., where he is now a research assistant to Professor Peters in the Aeronautics Department. That department, aided by funds from the National Advisory Committee for Aeronautics, is attacking the problem of turbulence, particularly at the boundaries of surfaces, and felt that a physics student should be a help. Hence the job for Carl. Just now he is preparing for work on the problem by studying fluid dynamics I think his interest in the subject must date back to our famous beer parties.

'Milt Dobrin has forsaken the academic ranks, now having a job with the Gulf Research and Development Company, a subsidiary of Gulf Oil. The laboratories are located in Harmarville, near Pittsburgh. Milt is being trained in the geophysical department, preparatory to being sent into the field with one of Gulf's seismic prospecting parties in search of oil. This training consists largely of working on records sent up by various field parties. In closing, Milt says he has seen several Tech Alumni lately, including Lea Spring and Stan Johnson.

. . . Carl White is still at Southbridge and still going strong. The description of the lab he has built up for himself is enough to make any good physicist's mouth water. So far Carl has been busy building up some apparatus he has designed, but he expects to have it in opera-

tion soon. Then, of course, he'll be making refinements in it. Outside working hours, when he isn't working on radio, he works on his play. The novel which he reported he was writing a while back has been relegated to a corner, but at least he hasn't torn it up yet. Seems to me that if he finishes up all his projects at once he may burn up on account of undissi-

pated energy.

"As you know by now, I was married on September 18 here in Rochester. We took a trip through New England and had swell weather during the entire two weeks (one rainy day excepted), which was some relief after all the cloudy weather we have here. Stopped by for a short time at school but didn't see many people I knew. Work goes on as usual at the Kodak labs. The Kodak Park works are certainly humming now, production is very large, and several new buildings are being constructed. . .

Course XIII. Always a faithful correspondent, Art Wells comes through with another letter this month: October I spent one week-end in Boston. Visiting the Institute Saturday morning, I enjoyed seeing Professors Jack, Owen ['94], and Burtner ['15], and Carl Engstrom. Carl is an instructor in the department and is assisting Professors Owen and Burtner in ship design courses. He had an interesting summer acting in a technical capacity at the Herreshoff yard in Bristol, R.I., his work keeping him in close touch with the maintenance of the J Class cup yachts. The climax of Carl's news, however, was the announcement, on October 9, of his engagement to Margaret Edwards of Cambridge. Having seen her picture, I know why Carl is mighty proud.

"Art Mayo has gone way out west to Akron, Ohio, and has taken up work with Lucian Moffett, Inc., makers of Goodrich Cutless bearings. - Clarence Horton is now with the Dravo Corporation in Pittsburgh and is living at 530 Academy Avenue, Sewickley, Pa. — I am still located in the maintenance department of the Colombian Line and am finding the work no less interesting than at first. We have just given each of the ships a ten-day lay-up, during which

time they were dry-docked, the turbines were opened up, as was most of the other machinery, and our little department has

ton covers his Course pretty thoroughly in one page: "... As usual, Dick Hitchcock crashes through with a letter, which this time consists largely of questions, either direct or implied. He is still busy solving Revere's new research problems as they arise and sends some very good photographs of the plant and laboratory, with several excellent shots of various parts of the interior of the lab. He notes that the company is quite secretive about some things (aren't they all?) so that he can't show much in the way of equipment. . . . Harold Brown writes from Arlington, N.J., that when American Steel and Wire closed its Worcester plant for an indefinite period on October 24, he was transferred to the United States Steel Research Laboratory in Kearney, N.J., and has been there since November 1. His new address is: 34 Alpine Place, Arlington, N.J. Brownie has developed an unsuspected interest in research, since graduation, and likes his new work well enough to do a lot of brushing up on his steel metallurgy in his spare time. He objects to being a subordinate and unable to run his own projects but says that this is made up for by the better hours and greater interest of his work.
"Saw Dick Robinson at the Alumni

Association luncheon a few days ago and ascertained that both he and Bill Hope, IX-B, have taken unto themselves wives and are still at work for Mathieson Alkali and Moore Research, respectively. I'll have Dick's new address when I see you, if possible. Bill's is 1539 Niagara Avenue. At the luncheon I also met Robert P. Willard, II, who is also employed by Moore Research, and is at present designing machinery for American Salesbook. — The wedding of Bill Hope to Miss Katherine Briggs, that Jack mentions, occurred on October 30 at the home of the bride in Newton Highlands. Bill's wife is an alumna of Emerson College and Chandler School in

THE TECHNOLOGY REVIEW

Now we come to the section of our notes which might be entitled, "Odd Items from Everywhere." First, we are sorry to hear of the death of Arthur G. Greenwell, XV, on July 7, at South Kona, Hawaii. Further details are not available. — Clax Monro, XV, is now working for J. Walter Thomson Company, an advertising firm in New York City. — Ben Sharp, XV, has been transferred by General Electric to the Winter Street works in Fort Wayne, Ind. — Ralph Van Sant, Jr., XV, is with the Republic Steel Corporation. Bargar Man Republic Steel Corporation, Berger Manufacturing division, Canton, Ohio. — John Fisher, Jr., XII, is away over on the other side of the world in the Philippine Islands. He is working for the Mayon Mining Corporation of Manila. — Daniel Pearson, Jr., XVI, is with Pan American Airways at Alameda, Calif. - Robert Larsh, X-A, is in Savannah, Ga., working for the Atlantic Creosoting Company. — John M. Cooper, IV, is in New York City with the Hobart Manufacturing Company. - Joseph Garside, XVI, was married to Miss Dorothy Shaw of Canton, Mass., on October 9. After a wedding trip through the White Mountains in New Hampshire, Joe returned to his work as manager of the Norwood branch of Wiggins Airways, Inc. — The wedding of Bill Prichard, XV, to Miss Ruth Pope of Beverly, a graduate of Wheaton College, occurred on October 10. After a wedding trip to Bermuda, the newlyweds are living at 4 Linden Street, Marblehead. — George Putnam, X, was married on October 9 to Miss Vesta Alden of Westfield, N.J. They live in Lockport, Ill. — The engagement of Arnold A. Kruse, X, to Miss Lillian Edith Simm of Belmont has been announced. Miss Simm, a graduate of Bouve and Simmons, is a teacher of physical education at Waimea High School near Kruse's home in Kauai, Hawaii.

In conclusion, I want to remind you again to send that pledge to the Alumni Fund today. — ANTON E. HITTL, General Secretary, 100 Highland Avenue, Buffalo, N.Y. ALLAN W. HORTON, Jr., Assistant Secretary, Room 3-210, M.I.T.,

Cambridge, Mass.

From the Files of the Alumni Fund Committee

Boston.

TO CONTRIBUTE is a mighty fine privilege. Anything that I could give toward the advancement of M.I.T. would be incommensurate with the associations, the benefits, and faith in the Institute and what it will do for coming generations, which are mine.

— From a Member of the Class of 1891



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